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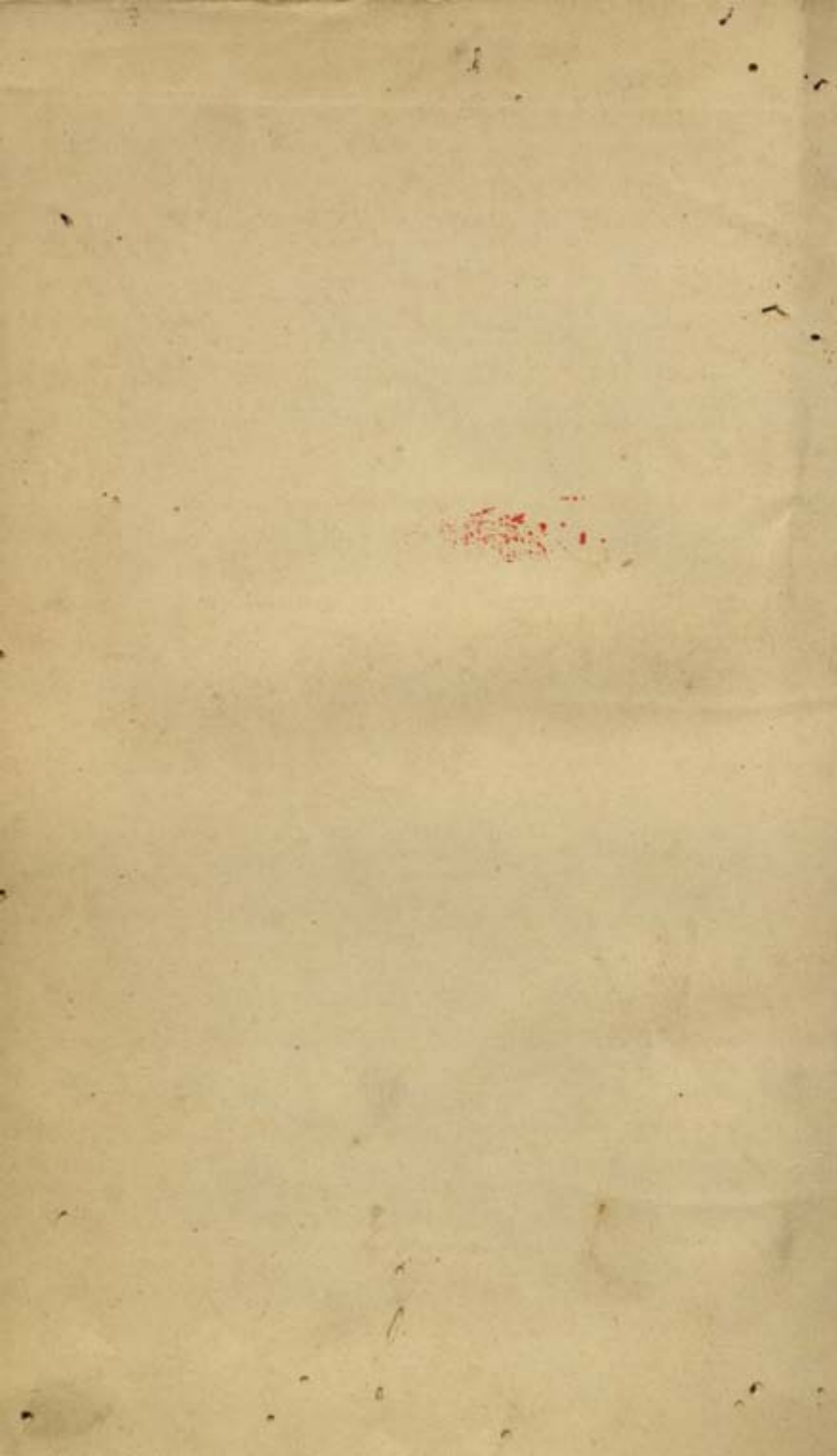
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THE
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OF THE
ROYAL GEOGRAPHICAL SOCIETY.

VOLUME THE THIRTY-SECOND.

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J.R.G.S.

1862.

EDITED BY DR. NORTON SHAW,

M.B., F.R.C.S. of London; Licentiate of Medicine and Surgery of Copenhagen; Hon. Mem. of the Ethn. Soc. of London, Paris, and New York; of the Geogr. Soc. of Denmark; Fellow of the Royal Society of Northern Antiquaries of Denmark; Corresp. Mem. of the Imperial Geogr. Soc. of St. Petersburg and Vienna; of the Imp. Geol. Inst. of Vienna, and of the Geogr. Soc. of Paris, New York, Darmstadt, &c.

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CONTENTS OF VOL. XXXII.

	PAGE
Council Report, Balance-Sheet for 1861, and Estimate for 1862 ..	v—x
Summary of Audited Accounts, 1830 to 1861	xi
Abstract of Receipts and Payments, 14th July, 1830, to 31st Dec. 1862 ..	xii, xiii
Library Regulations, List of Council, Officers, and Fellows ..	xiv—lxv
List of Public Institutions, &c., to which the Publications are presented ..	lxvi
Individuals to whom the Royal Premium has been awarded	lxvii
Accessions to Library and Map-rooms, with Names of Donors	lxx
Instruments lent out. Presentation of Gold Medals	xcix—ciii
Anniversary Address, by Lord Ashburton	civ—clxxii

[N.B. The Authors are alone responsible for the contents of their respective papers.]

ARTICLES.	PAGE
1.—Notes on the Yang-tsze-Kiang, from Han-kow to Ping-shan. By Lieut.-Col. HENRY ANDREW SAREL, F.R.G.S., 17th Lancers ..	1
2.—Notes on the Yang-tsze-Kiang, &c. By Dr. ALFRED BARTON, F.R.G.S.	26
3.—The Fiji Islands. By M. BENSUSAN	42
4.—Remarks on a Government Mission to the Fiji Islands. By BERTHOLD SEEMANN, PH. DR., F.L.S., F.R.G.S.	51
5.—Journey from Inhambane to Zoutpansberg, by JOAQUIM DE SANTA RITA MONTANHA. By JAMES MACQUEEN, Esq., F.R.G.S., &c. ..	63
6.—Description of the Ruins of the Acropolis of Cassope, in Epirus, 15 miles north of Prevesa. 1860. By Lieut.-Colonel COL- LINSON, R.E.	68
7.—The "Kuweik River," an Aqueduct. By D. J. MACGOWAN, Esq., M.D., U.S.	74
8.—Notes on an Excursion to Harrân, in Padan Aram, and thence over Mount Gilead and the Jordan, to Shechem. By CHARLES T. BEKE, Esq., PH. DR., F.S.A., F.R.G.S., &c. (Gold Medallist R.G.S.)	76
9.—The Hermon, and the Physical Features of Syria and Northern Palestine. By JOHN WORTABET, M.D.	100
10.—Narrative of an Expedition to the Andaman Islands, in 1857. By F. J. MOUAT, Esq., M.D., F.R.G.S., &c.	109
11.—On the Trade of the Eastern Archipelago with New Guinea and its Islands. By ALFRED R. WALLACE, Esq., F.R.G.S., &c. ..	127
12.—Report on the Brazilian Province of the Paraná. By the Hon. H. P. VEREKER, H.M. Consul at Rio Grande do Sul	137
13.—Notes on Cambodia, the Lao Country, &c. By M. HENRI MOUHOT. (Translated from the original French, by Dr. THOMAS HODGKIN, M.D., &c.)	142
14.—Journal of a Tour to Karen-ni, for the purpose of opening a Trading- Road to the Shan Traders from Mobyay and the adjacent Shan States, through that Territory, direct to Tungu. By EDWARD O'RILEY, Esq., F.G.S., &c.	164

ARTICLES.	PAGE
15.—Observations on the North-West Coast of Borneo. By SPENCER ST. JOHN, Esq., F.R.G.S., H.B.M. Consul General for Borneo ..	217
16.—Surface Currents of the Bay of Bengal during the South-West Monsoon. By J. A. HEATHCOTE, Esq., L.N.	234
17.—Remarks on the Mosquito Territory, its Climate, People, Productions, &c., &c., with a Map. By CHARLES N. BELL, Esq. ..	242
18.—Notes on the Rivers Arinos, Juruena, and Tapajos. By W. CHANDLESS, Esq.	268
19.—Narrative of a Journey through the Interior of Japan, from Nagasaki to Yeddo, in 1861. By Sir RUTHERFORD ALCOCK, K.C.B., F.R.G.S.	280
20.—Journal of Two Expeditions to the West Coast of the Middle Island of New Zealand in the Year 1859. By JOHN ROCHFORD, Esq., of Nelson; Surveyor	294
21.—On the Highland Region adjacent to the Trans-Indus Frontier of British India. By Major JAMES WALKER, of the Bombay Engineers, &c.	303
22.—Notes on the Flora of the Country passed through by the Expeditionary Force under Brigadier-General Chamberlain, against the Mahsood Wuzeris; April 17th to May 19th, 1860. By JOHN LINDSAY STEWART, Esq., M.D., Assistant-Surgeon	316
23.—Notes to accompany Sketch-Maps of the Zulu and Amatonga Countries, and of the Country between Aliwal, North, and Natal. By JOHN SANDERSON, Esq.	335
24.—Diary of Mr. JOHN M'DOUGALL STUART's Explorations, 1860-61 ..	340
25.—Expedition to the North-West Coast of Australia. By F. T. GREGORY, Esq., F.R.G.S.	372
26.—Exploring Expedition from Victoria to the Gulf of Carpentaria, under the Command of ROBERT O'HARA BURKE, Esq.	430
27.—Route in Exploring a Road from Albernie Canal to Nanaimo, in Vancouver Island, in May, 1861, with a Track Chart. By Commander RICHARD C. MAYNE, R.N., F.R.G.S.	529
28.—On the Isthmus of Tehuantepec. By HERR M. G. HERMESDORF ..	536
29.—Semipalatinsk. By N. ABRAMOF, Member of the Imperial Russian Geographical Society of St. Petersburg	555
30.—Notes on the Lake of Issyk-kul, and the River Kosbkar. By W. VENUKOF, Fellow of the Imperial Geographical Society of Russia ..	560
31.—The Geography of Bread-plants. By Ph. Dr. MICHELSEN	565
INDEX	567

ILLUSTRATIONS.

	PAGE		PAGE
1. SABEL	Yang-tze Kiang .. 1	9. CHANDLESS	Rivers Arinos, &c. .. 268
2. MACQUEEN	South-East Africa .. 63	10. ALCOCK ..	Japan 280
3. BEKE	Palestine, &c. 76	11. ROCHFORD ..	New Zealand 294
4. MOUHOT	Cambodia 142	12. WALKER ..	Trans-Indus Frontier .. 303
5. O'RILEY	Shan States 164	13. SANDERSON ..	Zulu Country 335
6. ST. JOHN	Borneo 217	14. GREGORY ..	N. W. Australia .. 372
7. HEATHCOTE	Bay of Bengal 234	15. BURKE ..	Victoria to Carpentaria .. 430
8. BELL	Mosquito Territory .. 242	16. MAYNE ..	Vancouver Island .. 529

Royal Geographical Society,

1862.

REPORT OF THE COUNCIL,

READ AT THE ANNIVERSARY MEETING ON THE 26TH MAY.

THE Council have much pleasure in submitting to the Society the accounts of the past year, and the customary notice of progress.

Members,—Ordinary, Honorary, and Corresponding.—The accessions to the Society since the last Anniversary amount to the great number of 234 Fellows. During the same period the Council regret to record the decease of 31 Ordinary Members.

The Society now consists of 1693 Fellows, and 55 Honorary and Corresponding Members.

Finances.—The accounts of the past year show an increase of receipts proportionate to the growth of the Society, whilst the disbursements, under every head of expenditure, have been kept within the estimates submitted to the last Meeting.

The permanent fund of the Society, at the close of the year, amounted to 6000*l.* New 3 per Cents, to which have since been added farther investments, amounting to 1500*l.*; the total amount of vested property being consequently 7500*l.*

Publications.—The 31st volume of the Society's 'Journal,' containing 14 maps and illustrations, edited by Dr. Norton Shaw, has been published, and is now ready for issue to the Fellows upon application.

Numbers 3, 4, and 5 of Volume V., and Nos. 1 and 2 of Vol. VI. of the 'Proceedings,' edited by Mr. Francis Galton, have also been published. Copies of both these publications have been duly

presented to the leading Scientific Institutions, Home and Foreign ; to the list of which have been added the University of Sydney, the National Observatory at Washington, and the Royal Academy of Sciences of Amsterdam.

Map-Rooms.—The accessions to this department since the last Anniversary comprise 438 maps and charts, and 10 atlases, all of which have been arranged in due geographical order. The following may be specially noticed :—Ordnance Maps of England, Wales, Scotland, and Ireland, consisting of 97 maps, on the scales of 1 and 6 inches to a mile. Admiralty Charts from the Hydrographic Department, comprising 145 charts of various parts of the world. Government Maps of Holland, Russia, and Switzerland ; Fraser's Map of Ceylon, by Arrowsmith ; Canton of Glarus, by Ziegler ; Ottoman Empire and Greece, on 12 sheets, presented by Mrs. A. L. Kerr ; Seat of War in America, on three sheets, by E. Stanford ; Ethnological Map of Finland, by Dr. Daa ; Maury's Map of the United States ; Charts of the China Sea, &c., by Imray and Son ; Stanford's new Map of London and Environs, on 24 sheets, scale 6 inches ; Australia, showing the route of recent explorers, &c.

General Atlases.—Diffusion of Useful Knowledge, corrected to date, by E. Stanford, Philip's Family Atlas, Lovell's Geography for Schools, Visscher's Ancient Atlas, American Atlas by T. J. Jefferys.

Special Atlases.—Schlagintweit's India and High Asia, parts 1 and 2 ; Gezigten uit Nierland's Indië, by Van de Velde ; Central America, by Kiepert ; Carnbée's Nederlandsch Indië ; the ' Dispatch ' Maps, including Map of London on nine sheets, scale $9\frac{1}{2}$ inches ; Mayr's Alpenländer, &c.

Views.—Model and section of a stern-wheel Steamboat—W. Kelly, Esq. ; Thomson's Photograph of the Tuapeka Gold-diggings, New Zealand ; Panoramic View of the Kashmir Mountains—T. G. Montgomerie, &c.

Instruments.—Presented by W. Ewer, Esq., F.R.G.S. :—Portable Transit Instrument, by Troughton and Simms ; Sextant, 10-in. radius, by ditto ; Artificial Horizon.

Library.—The additions to this department since the last Anniversary comprise 1030 books and pamphlets, including 150 volumes by purchase. Among these may be noticed Burton's ' City of the Saints ; ' Tyndall's ' Glaciers of the Alps ; ' Forbes'

'Norway;' Krapf's 'Eastern Africa;' Macpherson's 'Antiquities of Kertch;' Whiteside's 'Italy;' Cooke's 'China;' Marryat's 'Jutland and the Danish Isles;' Hind's 'Narrative of the Canadian Red River Expedition;' Ravenstein's 'Russians on the Amur;' Brenchley and Rémy's 'Great Salt Lake City;' Thomson's 'New Zealand;' Andersson's 'Okovango River;' Cleghorn's 'Forests and Gardens of South India;' Bosworth's 'Description of Europe, by King Alfred;' Hill's 'Peru and Mexico;' Fergusson's 'Topography of Jerusalem;' Domenech's 'Great Deserts of North America,' &c., &c.; and the Transactions of the Principal Literary and Scientific Institutions at home and abroad.

Expeditions.—The results of the expedition under the late adventurous but ill-fated Mr. R. O'Hara Burke, in Central Australia; of that under Mr. F. T. Gregory, in Western Australia; and of the enterprise jointly conducted by Colonel Sarel, Captain Blakiston, Dr. Barton, and the Rev. Mr. Schereschewsky, up the Yang-tsze-Kiang, have been duly reported to the Society. Accounts of the progress of the East African Expedition under Captains Speke and Grant, and of the auxiliary one under Consul Petherick up the White Nile in support of it, have also been received; as well as of the continued researches and explorations of our Medallist, the enterprising Dr. Livingstone. The indefatigable Captain R. Burton is also extending our knowledge of Western Africa, from his present quarters at Fernando Po.

Royal Premium.—The Founder's Gold Medal has been awarded to the representative of the late Richard O'Hara Burke, in remembrance of that gallant explorer, who, with his companion Wills, perished after having traversed the Continent of Australia from south to north; and the Patron's Gold Medal to Captain Thomas Blakiston, of the Royal Artillery, for his survey of the Yang-tsze-Kiang, from Yo-chow to Ping-shan, extending 900 miles beyond the farthest point previously reached by Englishmen.

The Council have also awarded to Mr. John King, the sole survivor of the Expedition under Burke, a Gold Watch, with a suitable inscription, as a recompence for his faithful and meritorious conduct.

House.—The Evening Meetings continue, by the kind permission of the University of London and the Royal Society, to be held at Burlington House.

MEMORANDUM.

The following alteration of the first paragraph of Section 5 is recommended by the Council for adoption:—

That the words The "*two Secretaries of the Society shall be Honorary Secretaries,*" &c., be The "*three Secretaries,*" &c.; and that Mr. William Spottiswoode be proposed as the new Honorary Secretary.

BALANCE-SHEET FOR THE YEAR 1861.

Expenditure.

	£.	s.	d.		£.	s.	d.
Cash Balances	710	11	4	Publications—Journal and Proceedings .. .. .	..	..	870 3 0
Subscriptions of 1018 Fellows .. .. .	..	..	2032 0 0	Salaries .. .. .	..	..	840 0 0
Compositions of 37 Fellows .. .. .	..	..	921 0 0	Rent, Taxes, Wages, &c. .. .. .	..	..	724 9 2
Entrance Fees of 266 Fellows .. .. .	..	..	798 0 0	Library and Map Rooms .. .. .	..	..	206 7 8
Parliamentary Annual Grant .. .. .	..	..	500 0 0	Office Expenses .. .. .	..	..	370 7 6
Sale of Publications, Advertisements, &c. .. .. .	..	..	160 0 0	Gold Medals .. .. .	..	..	46 0 0
Interest on Stock .. .. .	..	..	158 10 0	Subscriptions overpaid and returned .. .. .	..	..	17 0 0
Arrears of Subscriptions .. .. .	..	..	110 0 0	Additional purchase of 1500l. New 3 per Cents. .. .. .	..	..	1358 2 6
Royal Premium Grant .. .. .	..	..	52 10 0	Balance at Bankers'	£ 1049	2 1	
Rent of Stables (less Assessed Taxes) .. .. .	..	..	38 13 9	Cash in Office .. .. .	..	21 12 2	
Subscriptions overpaid .. .. .	..	..	17 12 0				1070 14 3
Miscellaneous Items .. .. .	..	..	4 7 0				
			£ 5503 4 1				£ 5503 4 1

Audited, 5th May, 1862.

T. H. BROOKING,
E. OSBORNE SMITH,
W. H. HALL.

Auditors.

ESTIMATE FOR THE YEAR 1862.

*Receipts.**Expenditure.*

	£.	s.	d.		£.	s.	d.
Annual Subscriptions	2000	0	0	Journal and Proceedings .. .. .	..	..	..
Life Compositions	600	0	0	Salaries .. .. .	..	..	..
Entrance Fees	700	0	0	Rent, Wages, Lights, &c. .. .. .	..	..	..
Arrears of Subscriptions	100	0	0	Library and Map Rooms .. .. .	..	..	..
Sale of Publications	100	0	0	Office Expenses .. .. .	..	..	..
Royal Premium Grant	52	10	0	Royal Premiums, &c. .. .. .	..	..	..
Parliamentary Annual Grant	500	0	0	Investments .. .. .	..	..	..
Dividends on Stock, &c.	200	0	0	Sundries for Balance .. .. .	..	..	..
Cash Balance, 1st January, 1862	1070	14	3				
	£5323	4	3				
					£5323	4	3

NORTON SHAW.

SUMMARY OF AUDITED ACCOUNTS

FROM 14TH JULY, 1830, TO THE 31ST DECEMBER, 1861.

*Receipts.**Payments.*

	£.	s.	d.		£.	s.	d.
Entrance Fees	7,320	0	0	Rent, Fixtures, and Fittings	12,043	16	11
Life Compositions	12,644	0	0	Office Expenses	5,646	8	5
Annual Subscriptions	22,688	3	0	Salaries—Secretary, Curator, Librarian, and Clerks	12,271	15	0
Grants in Aid	10,443	5	0	Cost of Geographical Publications	14,063	18	6
Royal Premiums	1,627	10	0	Purchase of Books, Maps, and Instruments	2,963	9	1
Sales of Geographical Publications	3,407	9	2	Grants in Aid of Expeditions	7,786	8	0
Dividends and other Receipts	5,063	3	10	Medals and other Premiums	1,762	2	0
Sales of Stock invested	2,963	5	2	Life Compositions invested	8,332	10	0
				Subscriptions returned	224	14	0
					£ 65,086	1	11
				Bankers' Balance and Petty Cash	1,070	14	3
					£ 66,156	16	2

London, 21st May, 1862.

E. OSBORNE SMITH, F.R.G.S.

ROYAL GEOGRAPHICAL SOCIETY.

ABSTRACT OF RECEIPTS AND PAYMENTS from 14th July, 1830, to 31st December, 1862.*

RECEIPTS.

PAYMENTS.

Year.	New Members.	Entrance Fees.	Life Compositions.	Annual Subscriptions.	Grants in aid, and Greenhouse Request.	Royal Premiums.	Sales of Geographical Publications.	Dividends and other Receipts.	Sales of Stock.	Total Receipts.	Rent, Fixtures, and Fittings.	Office Expenses.	Salaries, Secretary, Curator, and Clerks.	Cost of Geographical Publications.	Purchase of Books, Maps, and Instruments.	Grants in aid of Expeditions.	Medals and other Premiums.	Life Compositions Invested.	Subscriptions Returned.	Total Payments.		
											£. s. d.	£. s. d.	£. s. d.	£. s. d.	£. s. d.	£. s. d.	£. s. d.	£. s. d.	£. s. d.	£. s. d.	£. s. d.	£. s. d.
1831	450	1300	2,836	838 0	..	52 10	..	122 10 0	..	5,230 0 0	236 2 3	267 14 8	157 10	216 4 6	..	11 14 0	32 10 0	3637 10 0	28 0	4,627 5 5		
1832	12	36	136	144 0	..	52 10	67 18 2	130 0 0	..	586 8 2	132 7 0	166 16 3	78 15	..	26 3 0	50 0 0	..	..	..	394 1 3
1833	37	111	153	432 0	..	52 10	1 2 0	528 15 0	..	1,298 7 0	151 17 0	129 1 6	249 5	604 0 6	43 15 0	..	105 0 0	472 10 0	..	1,735 9 0		
1834	43	129	323	440 0	..	52 10	150 0 0	398 4 8	..	1,492 14 8	163 0 0	119 17 5	319 15	268 5 9	143 1 6	250 16 4	32 10 0	296 0 0	..	1,582 6 0		
1835	22	66	241	468 2	1,000 0	52 10	165 1 1	168 0 0	..	2,080 13 1	145 0 10	127 7 4	321 16	332 4 6	74 8 0	175 0 0	52 10 0	..	..	1,238 6 8
1836	59	117	323	464 2	..	..	112 2 0	168 0 0	..	1,184 4 0	126 7 10	192 16 2	316 14	514 5 3	191 18 0	846 12 0	162 5 0	..	..	2,250 15 3
1837	39	117	272	500 2	..	105 0	88 13 8	168 0 0	..	1,260 15 8	110 0 0	80 18 4	309 0	506 6 0	57 0 0	136 4 0	52 10 0	..	..	1,862 18 4
1838	65	105	459	564 2	500 0	52 10	128 17 6	168 0 0	..	2,067 9 6	505 0 0	122 6 7	280 0	699 18 5	87 10 6	844 17 6	101 0 0	..	..	2,539 13 0
1839	63	189	476	584 16	330 0	52 10	161 1 7	168 0 0	296 5 0	2,257 12 7	263 13 0	163 11 4	275 0	583 10 6	107 5 2	561 18 0	46 0 0	..	..	2,609 13 0
1840	60	180	442	650 5	250 0	52 10	185 1 2	165 10 0	..	1,925 6 2	377 4 7	173 10 4	350 0	731 18 8	335 4 2	313 2 9	46 0 0	..	..	2,349
1841	22	66	187	630 13	..	52 10	139 8 5	127 15 0	1328 15 0	2,532 1 5	286 0 11	132 8 8	425 0	263 13 0	32 5 1	5 15 0	46 10 0	..	..	1,211 12
1842	18	54	102	562 2	..	52 10	71 11 6	158 12 11	..	1,000 16 5	359 1 9	186 14 2	400 0	825 12 0	16 13 10	112 0 0	47 0 0	..	4 0	1,651 1		
1843	20	60	153	601 9	..	52 10	78 8 6	147 6 6	341 1 6	1,673 15 6	312 19 10	161 8 5	400 0	426 19 11	6 7 4	6 12 0	47 12 0	..	..	1,438 9
1844	36	108	337	633 1	..	52 10	127 9 0	137 12 2	..	1,415 12 2	204 18 3	151 16 8	400 0	549 5 11	10 9 0	..	45 10 0	..	5 3	1,877 14 10		
1845	48	144	323	585 1	..	52 10	73 9 5	133 7 0	..	1,311 7 5	279 4 2	117 8 7	237 16	6 7 6	7 0 3	..	46 0 0	200 0 0	..	893 10 6		
1846	30	90	170	374 0	200 0	52 10	116 6 2	109 14 0	286 17 6	1,655 7 8	271 6 2	102 3 1	150 0	171 9 4	1 13 6	..	46 14 0	..	12 0	735 6 1		
1847	16	48	50	478 0	..	52 10	30 16 6	92 3 11	..	751 10 5	333 19 4	173 13 11	250 0	284 19 8	7 0 6	..	46 14 0	..	2 0	1,098 7 6		
1848	10	30	25	390 0	..	52 10	61 11 3	137 9 2	246 4 4	942 14 9	270 10 4	163 0 9	200 0	244 8 2	5 18 6	..	49 5 0	..	4 0	877 2 9		
1849	13	39	25	460 0	..	52 10	88 12 6	113 0 6	..	778 3 0	263 13 0	163 2 7	200 0	219 3 0	3 1 1	..	52 10 0	..	5 3	966 14 8		
1850	24	72	171	530 0	..	52 10	86 14 9	124 5 8	..	1,036 10 5	273 14 9	186 9 0	324 0	457 9 9	83 15 6	340 3 0	46 14 0	..	9 0	1,675 6 0		
1851	40	120	245	436 4	..	52 10	105 11 0	97 6 8	..	1,056 11 8	257 14 9	196 9 0	324 0	457 9 9	83 15 6	340 3 0	46 14 0	..	17 1	2,197 19 3		
1852	60	180	148	554 0	38 5	52 10	122 15 8	124 12 8	..	1,220 3 4	1,122 0 8	208 7 8	443 0	338 18 11	21 17 0	..	46 14 0	..	2 0	2,636 3 1		
1853	100	300	472	638 0	50 0	52 10	84 15 3	75 14 5	224 1 10	1,917 2 6	1,244 19 11	250 7 10	576 0	394 9 0	118 14 4	..	49 12 0	..	..	3,367 19 1
1854	104	312	575	798 0	375 0	52 10	124 18 6	127 19 2	..	2,363 7 8	589 4 0	172 3 7	695 0	343 0 0	187 6 6	750 0 0	56 9 6	553 10 0	21 5	3,358 19 9		
1855	71	213	260	846 0	1,000 0	52 10	87 16 0	85 1 0	..	2,584 7 0	718 9 0	194 0 2	740 0	838 9 11	393 6 8	..	71 14 0	378 0 0	3 0	2,944 17 6		
1856	91	273	375	936 0	1,500 0	52 10	110 6 7	135 8 6	..	3,372 5 1	630 18 0	324 7 0	805 0	313 12 9	284 2 3	..	46 17 6	..	40 0	4,373 3 9		
1857	169	477	665	1,144 0	500 0	52 10	146 19 2	157 4 2	..	3,142 13 4	668 6 7	430 19 1	801 5	902 8 0	214 18 1	250 0 0	72 5 0	990 0 0	14 2	5,873 1 1		
1858	147	441	418	1,374 4	500 0	52 10	158 13 2	145 7 11	..	3,083 13 1	691 1 4	259 11 9	796 5	675 2 3	304 5 3	2600 0 0	71 0 0	468 17 6	18 18	4,432 9 10		
1859	155	465	543	1,374 0	500 0	52 10	172 1 0	168 4 8	..	3,471 18 8	724 9 2	379 7 6	840 0	870 3 0	206 7 8	..	46 0 0	1358 2 6	17 0	4,485 6 10		
1860	180	540	758	1,719 0	3,000 0	52 10	189 4 8	190 15 5	..	6,440 12 1	721 2 10	390 18 0	822 10	945 11 3	138 12 3	..	72 5 0	1389 7 6	12 0	10,571 8 9		
1861	206	798	921	2,142 0	500 0	52 10	160 9 0	219 2 9	..	4,792 12 9	12,735 19 9	6027 6 5	13,094 5	15,012 9 9	3102 1 4	7786 8 0	1834 7 0	9721 17 6	2 6 14	1,244 15 2		
1862	181	543	846	2,535 0	500 0	52 10	110 17 7	252 0 2	..	4,659 7 9	Bankers' Balance and Petty Cash										0,816 3 11	
											76,816 3 11											0,816 3 11

Abstracted from the Audited Accounts of the Society.

Permanent Fund 7,500*l.* New 3 per Cent.

Library Regulations.

I. The Library will be open every day in the week (Sundays excepted) from *Eleven* in the morning to *Five* in the afternoon,* except on New-Year's Day, Good Friday to Easter Monday inclusive, and Christmas week; and it will be closed one month in the year, in order to be thoroughly cleaned, viz. from the first to the last day of September.

II. Every Fellow of the Society is entitled (*subject to the Rules*) to borrow as many as four volumes at one time.

Exceptions :—

1. Dictionaries, Encyclopædias, and other works of reference and cost, Minute Books, Manuscripts, Atlases, Books and Illustrations in loose sheets, Drawings, Prints, and unbound Numbers of Periodical Works, *unless with the special written order of the President.*
2. Maps or Charts, *unless by special sanction of the President and Council.*
3. New Works before the expiration of a month after reception.

III. The title of every Book, Pamphlet, Map, or Work of any kind lent, shall first be entered in the Library-register, with the borrower's signature, or accompanied by a separate note in his hand.

IV. No work of any kind can be retained longer than one month; but at the expiration of that period, or sooner, the same must be returned free of expense, and may then, upon *re-entry*, be again borrowed, provided that no application shall have been made in the mean time by any other Fellow.

V. In all cases a list of the Books, &c., or other property of the Society, in the possession of any Fellow, shall be sent in to the Secretary *on or before the 1st of July in each year.*

VI. In every case of loss or damage to any volume, or other property of the Society, the borrower shall make good the same.

VII. No stranger can be admitted to the Library except by the introduction of a Fellow, whose name, together with that of the Visitor, shall be inserted in a book kept for that purpose.

VIII. Fellows transgressing any of the above Regulations will be reported by the Secretary to the Council, who will take such steps as the case may require.

* By Order of the Council,

NORTON SHAW.

ROYAL GEOGRAPHICAL SOCIETY.

Patron.

THE QUEEN.

Vice-Patron.

H.R.H. THE PRINCE OF WALES.

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FELLOWS.

(To FEBRUARY, 1863.)

N.B.—Those having * preceding their names have compounded for life.

Year of
Election

- 1860 À Beckett, Arthur M., Esq., F.R.C.S.E., 15, *Uxbridge-road, Surbiton, S.W.*
- 1851 Abinger, W. F. Scarlett, Lord. 70, *Jermyn-street, S.W.*
- 1855 Acland, Prof. Henry Wentworth, M.D. *Oxford.*
- 1861 Acland, J. Barton Arundel, Esq. *Mount Peel, Canterbury, New Zealand.*
- 1853 Acland, Sir Peregrine Palmer F. P., Bart. *Fairfield, Somerset.*
- 1830 *Acland, Sir Thomas Dyke, Bart., F.R.S. *Waterloo-hotel, Jermyn-street, S.W.; and Killerton, Exeter, Devon.*
- 1862 Adams, Edwin, Esq. *Lower School, Dulwich College, S.*
- 1861 Addington, Right Hon. H. U. 78, *Eaton-place, S.W.*
- 1862 Addison, Col. Thomas, C.B. *Aldershot.*
- 1860 10 Agnew, Sir Andrew, Bart., M.P. *Lochnaw-castle, Wigtonshire.*
- 1861 Aikin, James, Esq. *Liverpool.*
- 1859 Ainslie, Col. H. Francis. *Junior United Service Club, S.W.; and Burlington-chambers, 180, Piccadilly, W.*
- 1830 *Ainsworth, W. Francis, Esq., F.S.A. *Ravenscourt-villa, New-rd., Hammer-smith, W.*
- 1857 Airey, John Moore, Esq. *Conservative Club, S.W.*
- 1859 Airlie, David Graham, Earl of. *Holly-lodge, Kensington, W.*
- 1860 Aitchison, David, Esq. 180, *Piccadilly, W.*
- 1830 *Albemarle, George Thomas, Earl of. 11, *Grosvenor-square, W.; Quiddensham-hall, Larkingford, Norfolk; and Elvedon-hall, Suffolk.*
- 1862 Alcock, Sir Rutherford, K.C.B. 10, *Halfmoon-street, Piccadilly, W.*
- 1834 *Alcock, Thomas, Esq., M.P. *Kingswood-warren, near Epsom, Surrey.*
- 1838 20 *Aldam, William, Esq. *Frickley-hall, near Doncaster.*
- 1857 Aldrich, Captain Robert D., R.N. *Windmill-road, Croydon, Surrey, S.*
- 1830 Alexander, Colonel Sir Jas. Ed., K.L.S., F.R.A.S., etc., 14th Regt. *United Service Club, S.W.; and Westerton-house, Bridge of Allan, N.B.*
- 1855 Alger, John, Esq. 16, *Oakley-square, N.W.*
- 1857 Allan, George W., Esq. *Toronto, Canada.*
- 1858 Allan, Jas., Esq. 122, *Leadenhall-street, E.C.*
- 1835 *Allen, Capt. Wm., R.N., F.R.S. *Athenaeum Club, S.W.; and 7, Russell-st., Bath.*
- 1859 Alsager, Thos. H., Esq. *Reform Club, S.W.; and Chislehurst, Kent.*
- 1859 Ansell, Henry, Esq. 3, *Norfolk-crescent, Hyde-park, W.*
- 1854 Ancona, J. S., Esq. 8, *John-street, Adelphi, W.C.*
- 1860 30 Anderdon, John Edmund, Esq. 4, *Stanhope-street, Hyde-park-gardens, W.*
- 1862 Anderson, James, Esq. 1, *Billiter-court, City, E.C.*

- Year of Election.
- 1861 Anderson, John, Esq. 64, *Mark-lane, E.C.*; and *Peterhead, Aberdeenshire.*
- 1861 *Anderson, Col. W., C.B. 19, *Gloucester-square, Hyde-park, W.*
- 1856 *Andrew, William P., Esq. *Oaklands, Sydenham, Kent, S.E.*
- 1861 Annesley, Col. the Hon. Hugh, M.P. 25, *Norfolk-street, Park-lane, W.*
- 1860 *Anson, Sir John William Hamilton, Bart. 55, *Rutland-place, S.W.*
- 1853 Ansted, Prof. D. T., M.A., F.R.S., etc. *Athenæum Club, S.W.*; and *Bonair St. Martin, Guernsey.*
- 1857 Anstruther, M.-Gen. Philip, C.B., *Madras Artillery.* 1, *Chapel-st., Grosvenor-place, S.W.*
- 1830 *Antrobus, Sir Edmund, Bart. 146, *Piccadilly, W.*; *Lower Cheam, Epsom, Surrey*; and *Amesbury, Wilts.*
- 1858 40 Arbuthnot, George, Esq. 23, *Hyde-park-gardens, W.*
- 1862 Arbuthnot, Lieut. George, R.H.A. *Concarth, Sunningdale.*
- 1860 Arcedeckne, Andrew, Esq. 35, *Albemarle-street, W.*
- 1861 Archer, Graves Thos., Esq. 1, *Ennismore-place, Prince's-gate, S.W.*
- 1860 Archer, W. H. D., Esq., of Tasmania. 20, *Kinj-street, Portman-square, W.*
- 1855 *Arden, Richard Edward, Esq. *Sunbury-park, Middlesex, S.W.*
- 1858 *Armistead, Rev. Charles John, M.A., F.S.A. *Long's-hotel, New Bond-street, W.*; *National Club, S.W.*; and *Roundhay, near Leeds.*
- 1857 Armstrong, Alexander, Esq., M.D., R.N., F.R.C.P., Deputy Inspector-General Royal Naval Hospital, Malta. *H.M.S. 'Pembroke,' Harwich*; and *Junior United Service Club, S.W.*
- 1830 *Arrowsmith, John, Esq., F.R.A.S. 35, *Hereford-square, Old Brompton, S.W.*
- 1863 Arthur, Commander William, R.N. *Army and Navy Club, S.W.*
- 1859 50 Ashburton, William Bingham, Lord, F.R.S. *Bath-house, Piccadilly, W.*; and *The Grange, Abresford, Hants.*
- 1853 *Ashwell, James, Esq., M.A., F.G.S.
- 1851 Astley, Francis D. P., Esq., M.R.I. 67, *Eaton-square, S.W.*
- 1830 *Atkins, John Pelly, Esq., F.S.A. *Halsted-house, near Sevenoaks.*
- 1860 Attwell, Professor Henry. *Barnes, S.W.*
- 1839 Attwood, Matthias Wolverley, Esq. 27, *Gracechurch-street, E.C.*
- 1861 Aubin, William, Esq. 3, *Furnival's-inn, Holborn, E.C.*
- 1859 Austen, Capt. Henry H. Godwin, 24th Foot, Trig. Survey, Panjab. *Junior United Service Club, S.W.*; and *Chilworth-mansion, Guildford, Surrey.*
- 1854 Ayrton, Acton S., Esq., M.P.
- 1845 *Ayrton, Frederick, Esq. *Egypt.*
- 1836 60 *Back, Rr.-Adm. Sir Geo., D.C.L., F.R.S. 109, *Gloucester-place, Portman-sq., W.*
- 1862 Bagot, Capt. L. H. 55, *Inverness-terrace, W.*
- 1855 Baikie, Wm. Balfour, Esq., M.D., R.N. *Niger Expedition. Brunswick-cottage, Furton-road, Gosport.*
- 1859 Bailey, L. C., Esq., R.N. *Topographical Department, New-street, Spring-gardens, S.W.*
- 1857 Baillie, Capt. John, 26th Bengal Native Infantry. *India.*
- 1862 Baillie, John B., Esq. *Lays-castle, Inverness.*

Year of Election.	
1861	Baillie, William Henry, Esq. 67, <i>Belgrave-square, S.W.</i>
1862	Bailly, Lieut.-Col. John. <i>Ordnance Survey Office, Glasgow.</i>
1861	*Baker, John, Esq.
1862	Baker, Capt. Robert B. 23, <i>Clifton-villas, Maida-hill, W.</i>
1855	70 Baker, Capt. Wm. T., 85th Regt. <i>Junior United Service Club, S.W.; and 31, Grosvenor-place, Bath.</i>
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1861	Balfour, David, Esq. <i>Balfour-castle, Kirkcwall, N.B.</i>
1847	Balfour, Lieut.-Colonel George, M.A. <i>East Indies.</i>
1853	Balfour, John C. B., Esq. <i>New South Wales; and Colinton, Queensland.</i>
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1860	Ball, John, Esq. 18, <i>Park-street, Westminster, S.W.</i>
1852	Bancroft, Capt. W. C., 16th Regt. <i>Aide de Camp and Military Sec., King's House, Jamaica; McGregor and Co., Charles-street, S.W.</i>
1862	Banks, George F., Esq., Surgeon, R.N. <i>Llandudno, North Wales.</i>
1858	Bannerman, Sir Alexander, Bart. <i>Crimmonmogote, Aberdeenshire.</i>
1840	80 *Barclay, Arthur Kett, Esq., F.R.S. <i>Park-street, Southwark, S.E.; and Bury-hill, Dorking, Surrey.</i>
1852	Barclay, David, Esq. <i>Eastwick-park, Surrey.</i>
1858	Baring, The Hon. Francis. 16, <i>St. James's-square, S.W.</i>
1838	Baring, Rt. Hon. Sir Francis T., Bart., M.P., F.R.S. <i>Stratton-park, Andover, Hants.</i>
1835	*Baring, John, Esq. <i>Oakwood, Chichester.</i>
1844	*Baring, Thomas, Esq., M.P. 41, <i>Upper Grosvenor-street, W.</i>
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1858	Barratt, James, Esq. <i>Lymne-hall, near Harrington, Cheshire.</i>
1862	Barrett-Leppard, Capt. C. E. 7, <i>Albemarle-street, W.</i>
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1863	Barry, Alfred, Esq. <i>Beckenham, Kent, S.W.</i>
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1862	Barton, Dr. Alfred.
1837	*Bateman, James, Esq., F.R.S., L.S. <i>Knyppersley-hall, Staffordshire.</i>
1859	Bateman, John F., Esq., C.E. 16, <i>Great George-street, Westminster, S.W.</i>
1852	*Bates, Josh., Esq. 21, <i>Arlington-st., Piccadilly, S.W.; and East Sheen, Surrey, S.W.</i>
1843	100 Bathoe, Charles, Esq. 28, <i>York-place, Portman-square, W.</i>
1858	Baxendale, Joseph H., Esq. 14, <i>Chester-terrace, Regent's-park, N.W.; and Scott's-bridge, near Rickmansworth, Herts.</i>
1862	Baynes, Lieut.-Col. R. Stuart. <i>Army and Navy Club, S.W.; and 38, Jermyn-street, S.W.</i>

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1852	Beardmore, Nathaniel, Esq., C.E. 30, <i>Great George-street, Westminster, S.W.</i>
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1856	Beaumont, John Aug., Esq. <i>Wimbledon-park-house, Wimbledon, S.W.; and 50, Regent-street, W.</i>
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1830	Becher, Capt. Alex. B., R.N. <i>Admiralty, S.W.; and 13, Dorset-place, Dorset-sq., N.W.</i>
1861	110 Beckett, James F., Esq., R.N. 15 <i>Buckland-crescent, Belsize-park, N.W.</i>
1838	*Beckford, Francis L., Esq. <i>Travellers' Club, S.W.</i>
1854	Bedford, Commander Edward James, R.N. <i>Oban, N.B.</i>
1859	Bedford, Capt. G. Augustus, R.N. 5, <i>Ormond-terrace, Regent's-park, N.W.</i>
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1860	Beeton, Samuel Orchard, Esq. 248, <i>Strand, W.C.; and Pinner, Middlessex, W.</i>
1861	*Begbie, James, Esq. 27, <i>Mark-lane, E.C.</i>
1860	Begbie, Thomas Stirling, Esq. 4, <i>Mansion-house-place, E.C.</i>
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1853	Belcher, Rev. Brymer. <i>St. Gabriel's, Pimlico, S.W.</i>
1830	120*Belcher, Rear-Adm. Sir Edward, C.B., F.R.A.S. 7, <i>Norland-square, W.; and Union Club, S.W.</i>
1858	Beldam, Edw., Esq. 1, <i>Stone-buildings, Lincoln's-inn, W.C.; and Royston, Herts.</i>
1848	Beldam, Joseph, Esq. <i>Royston, Herts.</i>
1858	*Bell, C. Davidson, Esq., Surveyor-General, Cape of Good Hope. <i>Cape Town.</i>
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1830	*Bell, James Christian C., Esq. 42, <i>Westbourne-terrace, W.; and 15, Angel-court, Throgmorton-street, E.C.</i>
1830	*Bennett, John Joseph, Esq., F.R.S. <i>British Museum, W.C.</i>
1857	Bennett, J. Risdon, Esq., M.D. 15, <i>Finbury-square, E.C.</i>
1856	*Benson, Robert, Esq. 16, <i>Craven-hill-gardens, Baywater, W.</i>
1856	*Benson, William, Esq., Barrister-at-Law. <i>Oxford and Cambridge Club, Pall Mall, S.W.</i>
1830	130 Bentham, George, Esq., Pres. L.S. 25, <i>Wilton-place, S.W.</i>
1833	Bentley, Richard, Esq. <i>New Burlington-street, W.</i>
1859	Berens, H. Hulse, Esq. <i>Hudson-bay-house, Fenchurch-street, E.C.</i>
1861	Berkley, George, C.E. 24, <i>Great George-street, S.W.</i>
1858	Bernays, Adolphus, Esq., PH. DR., Professor of German. <i>King's College, W.C.; and 29, Inverness-road, W.</i>
1860	Bernays, Rev. Leopold John. <i>Great Stanmore.</i>
1856	Berry, Josiah, Esq. 16, <i>Regent-square, W.C.</i>
1842	*Bethune, R.-Admiral C. R. Drinkwater, C.B. 58, <i>Westbourne-ter., Hyde-park, W.</i>
1836	Betts, John, Esq. 115, <i>Strand, W.C.</i>

Year of
Election.

- 1862 Bicker-Caarten, Peter, Esq. 30, *Northumberland-place, Bayneater, W.*
- 1860 140 Bidder, Geo. Parker, Esq., C.E. 24, *Great George-st., S.W.; and Mitham, Surrey.*
- 1845 *Biddulph, Robert, Esq. 43, *Charing-cross, S.W.; 31, Eaton-place, S.W.; and Ledbury, Herefordshire.*
- 1859 Bigge, Frederick W., Esq. *Union Club, S.W.*
- 1850 Bigsby, John J., Esq., M.D. 89, *Gloucester-place, Portman-square, W.*
- 1858 Birch, Augustus F., Esq., M.A. Assistant Master, Eton College.
- 1860 Birch, H. W., Esq. 46, *Welbeck-street, Cavendish-square, W.*
- 1858 Birch, John William, Esq. 90, *New Broad-street, E.C.; and 27, Park-street, Grosvenor-square, W.*
- 1859 Birch, Capt. Thomas, R.N. *United Service Club, S.W.*
- 1862 Birchill, B. H. H. B., Esq. *Abney-house, Abney, Great Marlow, Bucks.*
- 1847 *Bird, James, Esq., M.D. 27, *Hyde-park-square, W.*
- 1858 150 Bishop, George, Esq., F.R.A.S. *Union Club, S.W.; and The Meadows, Twickenham, S.W.*
- 1861 Bishop, James, Esq. 16, *Park-square, Regent's-park, N.W.*
- 1836 *Blaauw, William H., Esq., M.A., F.S.A., F.Z.S. *Beechlands, near Uckfield, Sussex.*
- 1860 *Black, Francis, Esq. 6, *North-bridge, Edinburgh.*
- 1858 Blackett, Henry, Esq. 13, *Great Marlborough-street, W.*
- 1849 Blackie, W. Graham, Esq., F.R.S. 36, *Frederick-street, Glasgow.*
- 1861 *Blackney, William, Esq., Assistant-Paymaster, R.N. *H.M.S. 'Acton,' Millbrook, Devonport.*
- 1857 Blackstone, Alan C., Esq. *Board of Works, Whitehall-place, S.W.*
- 1862 *Blackstone, Frederick Elliot, Esq., B.C.L. *British Museum, W.C.*
- 1851 Blackwell, Thomas Evans, Esq., C.E. *Grand Trunk Railway, Montreal, Canada; and 7, Warwick-square, S.W.*
- 1854 160 Blaine, D. Robertson, Esq., Barrister-at-Law. 3, *Paper-buildings, Temple, E.C.; and 8, Southwick-place, Hyde-park-square, W.*
- 1857 *Blake, Wollaston, Esq. 8, *Devonshire-place, W.*
- 1859 Blakeley, Capt. Alexr., R.A. 34, *Montpelier-square, Rutland-gate, S.W.*
- 1857 Blakiston, Captain Thomas, R.A. 28, *Wellington-street, Woolwich, S.E.*
- 1830 *Blanshard, Henry, Esq., F.R.A.S. 53, *Chancery-lane, W.C.*
- 1861 *Blanshard, Henry, Esq. *Upper Bedford-place, W.C.*
- 1857 Blanshard, Richard, Esq. *Fairfield, Lymington, Hants.*
- 1854 Blencowe, W. Robert, Esq. *The Hook, Leves.*
- 1861 Blenkin, William, Esq. *Addlestone, near Chertsey, Surrey.*
- 1839 *Blewitt, Octavian, Esq. 4, *Adelphi-terrace, Strand, W.C.*
- 1852 170 Block, Samuel Richard, Esq. *Green-hill, near Whetstone, Herts.*
- 1861 Bloxsome, Oswald, Esq. *Addlestone-house, Chertsey, Northumberland.*
- 1837 *Blunt, Jos., Esq. 13, *Austin-friars, E.C.*
- 1858 Bohn, Henry G., Esq. *York-st., Covent-garden, W.C.; and North-end-house, Twickenham, S.W.*
- 1850 Bollaert, Wm., Esq., Corr. Mem. University of Chile. 214, *Hammer-sq., W.*

Year of Election.	
1862	Bolton, Capt. Francis John, 12th Regt. <i>Chatham.</i>
1861	Bompas, George Cox, Esq. 15, <i>Stanley-gardens, Kensington-park, W.</i>
1861	Bonney, Charles, Esq. <i>Adelaide, Australia.</i>
1858	Bonnor, George, Esq. 49, <i>Pall-mall, S.W.</i> ; and 2, <i>Baywater-terr., Kensington-square, W.</i>
1859	Borough, Sir Edward, Bart. 32, <i>Brook-street, Grosvenor-square, W.</i> ; and 4, <i>Nassau-street, Dublin.</i>
1845	180* Borrer, Dawson, Esq. <i>Altmont Ballon, Co. Carlow, Ireland.</i>
1856	Botcherby, Blackett, Esq., M.A. 48, <i>Brompton-rose, S.W.</i>
1839	* Botfield, Beriah, Esq., M.P., F.R.S., F.S.A., F.R.S.N.A. 5, <i>Grosvenor-square, W.</i> ; and <i>Norton-hall, Daventry, Northamptonshire.</i>
1858	* Botterill, John, Esq. <i>Flower-bank, Burley-road, Leeds.</i>
1860	Boustead, John, Esq. 34, <i>Craven-street, Strand, W.C.</i>
1855	Bovet, Charles, Esq. 6, <i>Belvue-villas, Seven-sisters'-road, Holloway, N.</i>
1861	Bowen, Charles Christopher, Esq. <i>Christchurch, Canterbury, New Zealand.</i>
1854	* Bowen, Sir George Ferguson, K.C.M.G., M.A. <i>Governor of Queensland, Australia.</i>
1836	Bower, George, Esq. 6, <i>Tokenhouse-yard, E.C.</i>
1862	Bowie, John, Esq. <i>Conservative Club, S.W.</i>
1833	190 Bowles, Admiral William, C.B. 8, <i>Hill-street, Berkeley-square, W.</i>
1856	Bowman, John, Esq. 9, <i>King William-street, E.C.</i>
1862	Boyce, Rev. W. B., Secretary to Wes. Missy. Society. 38, <i>Milner-square, Islington, N.</i> ; and <i>Wesleyan Mission House, Bishopsgate-street, E.C.</i>
1845	Boyd, Edward Lennox, Esq., F.S.A. 35, <i>Cleveland-square, Hyde-park, W.</i>
1856	Boyne, G. Hamilton-Russell, Viscount. 22, <i>Belgrave-square, S.W.</i> ; <i>Brancepeth-castle, Durham</i> ; and <i>Burwarton-hall, Ludlow, Salop.</i>
1851	Bracebridge, Charles Holte, Esq. <i>Atherstone, Warwick.</i>
1858	Braddell, Thomas, Esq. <i>Magistrate at Penang.</i>
1857	Brady, Cheyne, Esq., Barrister-at-Law. 104, <i>Grafton-street, Dublin.</i>
1862	Braithwaite, Isaac, Esq. 68, <i>Old Broad-street, E.C.</i>
1857	Bramston, Thos. W., Esq., M.P. <i>Carlton Club, S.W.</i> ; and <i>Shreens, Chelmsford, Essex.</i>
1859	200* Brand, James, Esq. 109, <i>Fenchurch-street, E.C.</i>
1860	Brassey, T., Esq. 4, <i>Great George-street, S.W.</i> ; and 56, <i>Lowndes-square, S.W.</i>
1857	Brasted, Rev. J. B. 27, <i>Hampshire-terrace, Southsea, Hants.</i>
1859	Braybrooke, Philip Watson. <i>Assistant Colonial Secretary, Ceylon.</i>
1861	* Brenchley, Julius, Esq. <i>Oxford and Cambridge Club, S.W.</i> ; and <i>Milgate, near Maidstone, Kent.</i>
1846	Brereton, Rev. C. D., M.A. <i>Little Massingham, Rougham, Norfolk.</i>
1833	* Brereton, Rev. John, LL.D., F.S.A. <i>Bedford.</i>
1834	* Breton, William Henry, Esq., Lieut. R.N., M.R.I. 15, <i>Camden-place, Bath.</i>
1862	Brett, Charles, Esq. 44, <i>Cleveland-square, W.</i>
1857	Brett, John Watkins, Esq. 2, <i>Hanover-square, W.</i>
1858	210 Bridges, Nathaniel, Esq. 16, <i>Southwick-crescent, Hyde-park, W.</i>
1852	* Brierly, Oswald W., Esq. 8, <i>Lidlington-pl., Harrington-sq., Hampstead-rd., N.W.</i>

Year of
Election.

- 1861 *Bright, Sir Charles T. 1, *Victoria-street, Westminster, W.*; and 12, *Upper Hyde-park-gardens, W.*
- 1860 Bright, James, Esq., M.D. 12, *Cambridge-square, Hyde-park, W.*
- 1854 Brine, Capt. Frederic, R.E. *Army and Navy Club, S.W.*; *Claremont, Sidmouth*; and *Hong-Kong, China.*
- 1856 Brine, Commander Lindesay, R.N. *Army and Navy Club, S.W.*; *Royal Naval College, Portsmouth*; and *Claremont, Sidmouth.*
- 1861 Bristowe, Henry Fox, Esq. 53, *Rutland-gate, S.W.*
- 1861 Broadwater, Robert, Esq. 3, *Billiter-square, Fenchurch-street, E.C.*
- 1861 Brodie, Walter, Esq. 13, *Delanere Terrace, Hyde-park, W.*; and *The Gore, Eastbourne, Sussex.*
- 1861 Brodie, William, Esq. *Eastbourne, Sussex.*
- 1838 120 Brooke, Sir James, K.C.B., D.C.L. *Athenaeum Club, S.W.*; and *Sarawak, Borneo.*
- 1856 Brooke, Captain William, 30th Regt. 1, *Clifton-terrace, Ramsgate.*
- 1862 Brookes, Thomas, Esq. *Mattock-lane, Ealing, W.*
- 1856 *Brooking, George Thomas, Esq. 25, *Sussex-gardens, Hyde-park, W.*
- 1856 *Brooking, Marmaduke Hart, Esq. 5, *Norfolk-crescent, Hyde-park, W.*
- 1843 *Brooking, Thomas Holdsworth, Esq. 14, *New Broad-street, City, E.C.*; and 5, *Norfolk-crescent, Hyde-park, W.*
- 1863 *Broughall, William, Esq. *Broadwater, Down, Tunbridge-Wells.*
- 1850 Broughton, John, Lord, G.C.B., M.A., F.R.S. 42, *Berkeley-square, W.*; and *Erlstoke-park, Westbury, Wilts.*
- 1859 Broughton, L. P. Delves, Esq. 2, *Tunfield-court, Temple, E.C.*
- 1856 *Brown, Daniel, Esq. *The Elms, Larkhall-rise, Clapham, S.*
- 1860 230 Brown, James, Esq., M.P. *Rossington, Yorkshire.*
- 1861 *Brown, John Allen, Esq. 3, *Newcastle-place, Clerkenwell, E.C.*; and *Scaleby-lodge, Camden-road, N.*
- 1856 *Brown, Samuel, Esq. 11, *Lombard-st., E.C.*; and *The Elms, Larkhall-rise, Clapham, S.*
- 1858 *Brown, Thomas, Esq. 8, *Hyde-park-place West, W.*
- 1859 Brown, William, Esq. *Loat's-road, Clapham-park, S.*
- 1862 Browne, John Comber, Superintendent and Inspector of Government Schools. *Port Louis, Mauritius.*
- 1858 Browne, John H., Esq. *Port Gaxler, S. Australia.*
- 1858 Browne, William J., Esq. *Port Gaxler, S. Australia.*
- 1852 Browning, Henry, Esq. 72, *Grosvenor-street, W.*; and *Ampton-hall, Bury St. Edmund's.*
- 1856 *Browning, Thomas, Esq. 6, *Whitehall, S.W.*
- 1859 240 Bruce, Henry Austin, Esq., M.P. *Duffryn, Aberdare, Glamorganshire.*
- 1856 Bryant, Walter, Esq., M.D., F.R.C.S. 7, *Bathurst-street, Hyde-park-gardens, W.*
- 1844 Bryden, William, Esq. 6, *Great Queen-street, Westminster, S.W.*
- 1843 *Buchan, John Hitchcock, Esq. *The Grove, Hawell, W.*
- 1859 Buckland, Edward C., Esq. 11, *Laundowne-road, Notting-hill, W.*
- 1863 Bullock, Commander Charles J., R.N. *Hydrographic Office, S.W.*

Year of Election	
1830	*Bullock, Rear-Admiral Frederick. <i>Woolwich, S.E.</i>
1860	*Bunbury, Sir Charles James Fox, Bart.; F.R.S. <i>Barton-hall, Bury St. Edmund's.</i>
1839	Bunbury, E. H., Esq., M.A. 15, <i>Jermyn-street, S.W.</i>
1860	Banyon, C. J., Esq. 4, <i>Queen's-terrace, Queen's-gate, Kensington-gore, W.</i>
1861	150 Burges, William, Esq. <i>Fethard, Co. Tipperary.</i>
1858	Burmester, Edward, Esq. <i>St. Helen's-place, E.C.; and Springwell, Clapham-common, S.</i>
1830	*Burney, Ven. Archd. Charles Parr, D.D., F.R.S., F.S.A. <i>Rectory-house, Bishop's Wickham, Essex.</i>
1861	*Burr, Higford, Esq. 23, <i>Eaton-place, S.W.; and Aldermanston-court, Berkshire.</i>
1857	Burstal, Commander E., R.N. 6, <i>Park-villas, Lower Norwood, S.</i>
1830	*Burton, Alfred, Esq. 36, <i>Marina, St. Leonard's.</i>
1833	*Burton, Decimus, Esq., F.R.S. 6, <i>Spring-gardens, S.W.; and St. Leonard's-cottage, Hastings.</i>
1859	*Burton, Capt. Richd. Fras., 18th Regt. Bombay N.I., H.B.M. Consul, Fernando Po. 14, <i>St. James's-square, S.W.</i>
1847	Burton, S. S., Esq. <i>Calthorpe-hall, near Rugby.</i>
1858	Bury, William Coutts, Viscount, M.P. 48, <i>Rutland-gate, S.W.</i>
1861	160 Bush, Rev. Robert Wheeler, M.A. 1 <i>Milner-square, Islington, N.</i>
1861	Batler, Charles, Esq. 13, <i>Sussex-square, W.</i>
1859	Butler, Edward, Esq. <i>Lansdowne-road, Hyde-park, W.</i>
1860	*Butler, Rev. Thomas. <i>Rector of Langar, Nottinghamshire.</i>
1862	*Buxton, Chas., Esq., M.P. 7, <i>Grosvenor-crescent, S.W.; and Fox-warren, Surrey.</i>
1858	*Buxton, Sir Thomas Fowell, Bart. <i>Brick-lane, N.E.</i>
1830	*Cabbell, B. B., Esq., M.A., F.R.S., F.S.A. 1, <i>Brick-court, Temple, E.C.; 52, Portland-place, W.; and Aldwick, Sussex.</i>
1857	*Caldwell, Capt. Henry, R.N. <i>H.M.S. 'Mersey,' Portsmouth; and 3, Audley-sq., W.</i>
1861	Calthorpe, the Hon. Augustus Gough. 33, <i>Grosvenor-square, W.</i>
1855	*Calthorpe, the Hon. F. H. Gough, M.P. 33, <i>Grosvenor-square, W.</i>
1859	170 Calvert, Edmund, Esq. <i>British Embassy, Constantinople.</i>
1854	Calvert, Frederic, Esq., Q.C. 9, <i>St. James's-place, S.W.; and 8, New-square, Lincoln's-inn, W.C.</i>
1830	*Camden, George Charles, Marquis, K.G., D.C.L., M.A. <i>Wickerness-park, Sevenoaks, Kent; and Bayham-abbey, Sussex.</i>
1858	Cameron, Capt. Charles D.
1861	Cameron, Donald, Esq. <i>Achnacarry, Invernesshire.</i>
1858	Cameron, Major-General Duncan Alexander, R.E., C.B. <i>New Zealand.</i>
1861	Campbell, Capt. Frederick, R.N. 12, <i>Connaught-place, Hyde-park, W.</i>
1844	*Campbell, James, Esq. <i>Grove-house, Hendon, Middlesex; and 8, Park-street, Grosvenor-square, W.</i>
1857	Campbell, James, Esq., Surg., R.N. <i>Bangkok, Siam; and Luss, Dumbartonsh., N.B.</i>
1834	*Campbell, James, Esq., jun. <i>Hampton-court-green, S.W.</i>
1861	180 Campbell, James, Esq. <i>Regent-street, W.; and Thornton Steward, Yorkshire.</i>

Year of
Election.

- 1857 Camps, William, Esq., M.D. 40, *Park-street, Grosvenor-square, W.*
- 1857 Cannon, Lieut.-General P. 10, *Kensington-gardens-terrace, Hyde-park, W.*
- 1853 *Cardwell, Right Hon. Edward, M.P. 74, *Eaton-square, S.W.*
- 1861 Carter, Captain Hugh Bonham, Coldstream Guards. *Guards' Club, S.W.; and 6, Whitehall, S.W.*
- 1860 Cartwright, Capt. Henry, F.S.A. 13, *Gloucester-square, Hyde-park, W.*
- 1857 Cartwright, Col. Henry, Grenadier Guards, M.P. 1, *Tilney-street, Park-street, Grosvenor-square, W.*
- 1830 *Cartwright, Samuel, Esq., F.R.S., F.S.A. 32, *Old Burlington-street, W.; and Nizell's-house, Tonbridge.*
- 1860 *Carver, the Rev. Alfred J., D.D., Master of Dulwich College. *Dulwich, S.*
- 1858 Casella, Louis P., Esq. 23, *Hatton-garden, E.C.; and South-grove, Highgate, N.*
- 1860 190 Canfield, Colonel James Molyneux. 10, *Chester-square, Piccadilly, S.W.*
- 1860 Cave, Amos, Esq. 14, *Kennington-park, S.; and Rathbone-pl., Oxford-st., W.*
- 1857 Cave, Capt. Laurence Trent. 23, *Loxwood-street, Belgrave-square, S.W.*
- 1858 Cave, Stephen, Esq., M.P. 35, *Wilton-place, S.W.*
- 1861 Chambers, George Frederick, Esq. 2, *Palace-gardens-terrace, Campden-hill, W. and Eastbourne, Sussex.*
- 1858 Champion, John Francis, Esq. *North-road, Clapham-park, S.*
- 1834 *Chapman, Capt. John James, R.A., F.R.S. 33, *Adelaide-square, Bedford.*
- 1861 Charnock, Richard Stephens, Esq. 8, *Gray's-inn-square, W.C.*
- 1861 Choetham, John Frederick, Esq. *Eastwood, Staleybridge.*
- 1855 Cheshire, Edward, Esq. *Conservative Club, S.W.*
- 1838 300 *Chesney, Major-General Francis Rawdon, R.A., D.C.L., F.R.S. *Athenæum Club, S.W.; and Ballyardle, Down, Ireland.*
- 1858 Chetwode, Augustus L., Esq. 2, *Little Ryder-street, S.W.; and Chilton-house, Thame, Oxfordshire.*
- 1858 Childers, Hugh C. E., Esq., M.P. 17, *Prince's-gardens, W.; and Australia.*
- 1856 Childers, John Walbanke, Esq. *Cantley-hall, near Doncaster.*
- 1857 *Chimmo, Lieut. William, R.N. *Skye Island; and Admiralty, S.W.*
- 1861 Christian, Capt. Henry, R.N. *Commr. of the Royal Yacht, Portsmouth.*
- 1854 Christy, Henry, Esq. 103, *Victoria-street, S.W.; and Woodbines, near Kingston, Surrey, S.W.*
- 1854 *Church, J. W., Esq., B.A. *United University Club, S.W.; and Woodside, Hatfield.*
- 1830 Church, W. H., Esq.
- 1849 *Churchill, Lord Alfred Spencer, M.P. 16, *Rutland-gate, S.W.*
- 1856 310 Churchill, Charles, Esq. 29, *Sussex-square, Hyde-park, W.*
- 1853 Clarendon, George William, Earl of, K.G., G.C.B. 1, *Grosvenor-crescent, S.W.; The Grove, Watford, Herts; and Hindon, Wilts.*
- 1852 Clark, Daniel, Esq. 49, *Milner-square, Islington, N.*
- 1840 *Clark, Sir James, Bart., M.D., F.R.S. *Bayshot-park, Surrey.*
- 1862 Clark, Latimer, Esq. 1, *Victoria-street, Westminster, S.W.; and Cairo.*
- 1851 Clark, Rev. Samuel, M.A. *The Vicarage, Breckfordine.*

Year of Election.	
1859	Clarke, Capt. A., R.E. <i>Army and Navy Club, S.W.</i>
1860	Clarke, Rev. Joseph W., B.D., Chaplain R.N. <i>H.M.S. 'Hawke.'</i>
1859	Clarke, Samuel, Esq., C.E. 27, <i>Upper Brook-street, Ipswich.</i>
1855	*Clarke, Rev. W. B., M.A. <i>St. Leonard's, Sydney, New South Wales.</i>
1859	320 Clarke, Rev. W. Geo., M.A. <i>Trinity College, Cambridge.</i>
1862	Claude, Eugène, Esq. 22, <i>Park-road, Holloway, N.</i>
1842	Clavering, Sir William Aloysius, Bart., M.A. <i>United University Club, S.W.; Arwell-park, near Gateshead; and Greencroft, Durham.</i>
1863	Clayton, Capt. John W., late 15th Hussars. 14, <i>Portman-square, W.</i>
1860	Clerk, Capt. Claude.
1830	*Clerk, Rt. Hon. Sir George, Bart., D.C.L., F.R.S., &c. <i>Pennicuik-house, Edinburgh.</i>
1858	Clermont, Thomas, Lord. <i>Ravensdale-park, Newry, Ireland.</i>
1861	Clifford, Sir Charles. <i>Coldham-hall, Suffolk.</i>
1858	Clifford, Charles Cavendish, Esq., M.P. <i>House of Lords, S.W.</i>
1856	Clive, Rev. Archer. <i>Whitfield, Hereford.</i>
1854	330 Clowes, George, Esq. <i>Duke-street, Stamford-street, Blackfriars, S.; and Surbiton, Surrey.</i>
1854	Clowes, Wm., Esq. 31, <i>Gloucester-terrace, Hyde-park, W.</i>
1861	Clowes, William Charles Knight, Esq. <i>Duke-street, Stamford-street, Blackfriars, S.; and Surbiton, Surrey.</i>
1852	Cobbold, John Chevalier, Esq., M.P. <i>Athenæum Club, S.W.; and Ipswich, Suffolk.</i>
1859	Cochrane, Capt. the Hon. A., R.N., C.B. <i>Junior United Service Club, S.W.</i>
1862	Cockerton, Richard, Esq. 12, <i>Petersham-terrace, South Kensington, W.</i>
1862	*Cockle, George, Esq. 8, <i>Orington-square, Brompton, S.W.</i>
1859	Cocks, Colonel C. Lygon, Coldstream Guards. <i>Trevellyn-Vean, near Lisheard.</i>
1841	*Cocks, Reginald Thistlethwayte, Esq. 43, <i>Charing-cross, S.W.; and 22, Hertford-street, May-fair, W.</i>
1857	Coghlan, Edward, Esq. <i>Training Institution, Gray's-inn-road, W.C.</i>
1862	340 Coghlan, Gen. W. Marcus. R.A. <i>Commandant and Political Agent, Aden; and Ramsgate, Kent.</i>
1861	Coghlan, J., Esq., Engr.-in-Chief to the Government. <i>Buenos Ayres.</i>
1838	Colchester, Charles, Lord, Rear-Admiral, D.C.L. 34, <i>Berkeley-square, W.; and Kidbrooke, Sussex.</i>
1853	Cole, John Griffith, Esq., M.A., M.R.I. 8, <i>Charles-street, Berkeley-square, W.</i>
1841	*Colebrooke, Sir Thomas Edward, Bart., M.P., F.R.A.S. 37, <i>South-st., Park-lane, W.</i>
1834	Colebrooke, Lt.-General Sir Wm., R.A., M.G., C.B., K.H., F.R.A.S. <i>Datchet, near Windsor; and United Service Club, S.W.</i>
1854	Coleman, Everard Home, Esq., F.R.A.S. <i>Registry and Record Office, Adelaide-place, London-bridge, E.C.</i>
1848	Coles, Charles, jun., Esq. 86, <i>Great Tower-street, E.C.</i>
1835	*Collett, William Rickford, Esq.
1858	Collinson, Henry, Esq. 8, <i>St. James'-terrace, Paddington, W.</i>
1855	350 Collinson, Rear-Admiral Richard, C.B. <i>Haven-lodge, Ealing, W.; and United Service Club, S.W.</i>

Year of Election.	
1861	* Colville, Charles John, Lord. 42, <i>Eaton-place, S.W.</i>
1861	Combe, Thomas, Esq., M.A. <i>University Press, Oxford.</i>
1860	Coulingham, William, Esq., M.P. <i>Kemp-town, Brighton.</i>
1861	Constable, Commander Chas. Golding, R.N. 16, <i>Cunningham-pl., Maida-hill, W.</i>
1843	* Cook, James, Esq. 40, <i>Mincing-lane, E.C.</i> ; and 47, <i>Portland-place, W.</i>
1859	Cooke, Major A. C., R.E. <i>Topographical Department, 4, New-street, Spring-gardens, S.W.</i>
1860	Cooke, George Wingrove, Esq., Barrister-at-Law. 2, <i>Brick-court, Temple, E.C.</i> ; and 25, <i>Cheyne-walk, Chelsea, S.W.</i>
1856	Cooke, John George, Esq. 47, <i>Mount-street, Berkeley-square, W.</i>
1860	Cooke, Nathaniel, Esq. 5, <i>Ladbroke-terrace, Notting-hill, W.</i>
1852	360 Cooke, Robt. F., Esq. 50, <i>Albemarle-st., W.</i> ; and 38, <i>Nottingham-pl., New-rd., W.</i>
1860	Cooke, William Henry, Esq., Barrister-at-Law. 4, <i>Elm-court, Temple, E.C.</i>
1830	Cooley, William Desborough, Esq. 10, <i>Portman-street, Portman-square, W.</i>
1856	Cooper, Lt.-Col. Edward, Grenadier Guards. 36, <i>Hertford-street, W.</i>
1860	Cooper, Major Joshua H., 7th Fusiliers. <i>Gibraltar.</i>
1862	Cooper, Sir Daniel. 20, <i>Prince's-gate, S.W.</i>
1853	Coote, Charles Chidley, Esq. C4, <i>Albany, W.</i> ; and <i>Mount-Coote, Limerick, Ireland.</i>
1857	* Coote, Captain Robert, R.N. <i>H.M.S. 'Victory,' Portsmouth.</i>
1862	Cope, Walter, late H.M.'s Chargé d'Affaires at the Equador. 14, <i>The Terrace, Camberwell, S.</i>
1853	Copley, Sir Joseph William, Bart. <i>Sprotborough, Doncaster.</i>
1863	370 Corbet, Richard, Esq. 41, <i>Portman-square, W.</i> ; and <i>Adderley-hall, Shropshire.</i>
1860	Cornwell, James, Esq., PH. DR. <i>Loughborough-park-villa, Brixton, S.</i>
1839	* Corrance, Frederick, Esq. <i>Parkham-hall, Wickham Market, Suffolk.</i>
1856	Costerton, John C., Esq. <i>Canton.</i>
1853	* Cosway, William Halliday, Esq. <i>Oxford and Cambridge Club, S.W.</i>
1862	Coward, William, Esq. 5, <i>Park-villas, Lower Norwood, S.</i>
1857	* Cowell, Major J. C., R.E. <i>Buckingham-palace, S.W.</i>
1861	Cowell, John Jermyn, Esq. <i>Trinity College, Cambridge.</i>
1854	Cowley, Norman, Esq. 4, <i>Montagu-place, Montagu-square, W.</i>
1862	Cowper, Sedgwick S., Esq. 6, <i>South-street, Thurloe-square, S.W.</i>
1862	380 Cox, Edward William, Esq., Barrister-at-Law, Recorder of Falmouth. 1, <i>Essex-court, Temple, E.C.</i> ; and <i>Moat-mount, Highwood, Middlesex.</i>
1853	* Cracroft, Captain Peter, R.N., C.B. <i>H.M.S. 'Niger,' Australia.</i>
1858	Cranbourne, James, Viscount. 20, <i>Arlington-street, S.W.</i>
1853	Craufurd, Captain Frederic A. B., R.N. <i>United Service Club, S.W.</i> ; and <i>H.M.S. 'Egmont,' Rio.</i>
1857	Craufurd, Major-General James Robertson, Grenadier Guards. <i>Travellers' Club, S.W.</i> ; and <i>Sunning-hill, Chertsey.</i>
1857	Crawford, James, Esq. <i>Brussa, Turkey.</i>
1848	Crawford, Robert Wigram, Esq., M.P. 71, <i>Old Broad-street, E.C.</i>
1830	Crawford, John, Esq., F.R.S. <i>Athenaeum Club, S.W.</i> ; and 21, <i>Wilton-st., S.W.</i>

Year of Election.	
1861	Creswell, Rev. S. F., M.A. <i>The School, Durham.</i>
1854	*Creswell, Captain S. Gurney, R.N. <i>Lynn, Norfolk.</i>
1856	390 Croker, T. F. Dillon, Esq. 19, <i>Pelham-place, Brompton, S. W.</i>
1860	*Croskey, J. Rodney, Esq. 84, <i>King William-street, E.C.; and Warwick-house, Warwick-road, Paddington, W.</i>
1860	Crosse, the Rev. Thomas, D.C.L. <i>Hastings.</i>
1862	Crossman, James Hiscutt, Esq. <i>Upper Sydenham, Kent, S.E.</i>
1863	Crowder, Thos. Moseley, Esq., M.A. <i>Wadham College, Oxford.</i>
1852	Crowdy, James, Esq. 17, <i>Serjeants'-inn, E.C.</i>
1861	Crowley, Jonathan Sparrow, Esq., C.E. <i>Lavender-hill, Battersea, S. W.</i>
1861	Cruikshank, David, Esq. <i>Avenue-place, Southampton.</i>
1844	*Cubitt, William, Esq. <i>Gray's-inn-road, W.C.; and 21, Abchurch-lane, E.C.</i>
1859	Cull, Richard, Esq., F.R.S. 13, <i>Tavistock-street, Bedford-square, W.C.</i>
1857	400 Cumming, William Fullarton, Esq., M.D. <i>Athenæum Club, S. W.; and Athol-crescent, Edinburgh.</i>
1847	*Cunard, Edward, Esq. <i>Bush-hill-park, Edmonton, N.</i>
1846	Cunard, Sir Samuel, Bart. <i>Bush-hill-park, Edmonton, N.</i>
1860	Cunliffe, Roger, Esq. 24, <i>Lombard-street, E.C.; and 10, Queen's-gate, S. Kensington, W.</i>
1859	Cunningham, H. D. P., Esq., R.N. <i>Bury, near Gosport, Hants.</i>
1853	Cunningham, John Wm., Esq., Sec. King's College. <i>Somerset-house, W.C.; and Harrow, N. W.</i>
1862	*Cunynghame, Major-Gen. A. T., C.B. <i>Commanding Scind Division, Bombay.</i>
1843	*Cursetjee, Manockjee, Esq., F.R.S.N.A. <i>Villa-Byculla, Bombay.</i>
1839	*Curtis, Timothy, Esq.
1861	Dalrymple, F. Elphinstone, Esq., India Civil Service. <i>Albemarle-hotel, Albemarle-street, W.</i>
1857	410 Dalton, D. Foster Grant, Esq. <i>Parkstone, near Poole; and Shanks-house, near Somerset.</i>
1859	Dalyell, Robt. Alex. Osborn, Esq. <i>H.M.'s Consul at Jassy; and Royal Hospital, Greenwich, S.E.</i>
1851	*Daniell, Wm. Freeman, Esq., M.D., F.L.S. <i>Junior U. S. Club, S. W.; and 17, Charles-street, St. James's, S. W.</i>
1862	Darvall, John Bayly, Esq. 6, <i>Onslow-square, S. W.</i>
1838	*Darwin, Charles, Esq., M.A., F.R.S. <i>Athenæum Club, S. W.; and Down, near Bromley, Kent.</i>
1860	Dasent, John Bury, Esq. 22, <i>Warwick-road, Maida-hill, W.</i>
1861	Davies, Herbert, Esq., M.D. 23, <i>Finbury-square, E.C.</i>
1858	Davies, William, Esq. <i>West Indies.</i>
1858	Davis, Dr. Francis William, Surgeon R.N. <i>H.M.S. 'Spiteful'; and Lurganboy-house, Manor Hamilton, Ireland.</i>
1861	Davis, John Edward, Esq., R.N. <i>Admiralty Survey, Plymouth; and 8, Alfred-street, Plymouth.</i>

Year of
Election.

- 1846 420 Davis, Sir John Francis, Bart., K.C.B., F.R.S., F.R.S.E.N.A. *Athenæum Club, S.W.; and Hollywood, near Bristol.*
- 1840 *Dawnay, the Hon. Payan. *Beningborough-hall, Necton-upon-Ouse, Yorkshire.*
- 1859 De Blaquiere, John, Lord. 16, *Norfolk-street, Park-lane, W.*
- 1852 De Boinville, Chev. Alexander, K.L.H.
- 1858 De Bourgho, T. J., Esq. 6, *Charing-cross, S.W.*
- 1856 De Gex, William Francis, Esq. 8, *Serle-street, Lincoln's-inn, W.C.*
- 1853 De Grey and Ripon, George Frederick Samuel, Earl. 1, *Carlton-gardens, S.W.; and Studley Royal, Ripon.*
- 1862 Denham, Capt. Henry Mangles, R.N., C.B. 16, *Delemere-terrace, W.*
- 1860 Denison, Alfred, Esq. 6, *Albemarle-street, W.*
- 1834 *Denison, His Excellency Sir William Thomas, Lieut.-Col. R.E., F.R.S. *Governor of Madras.*
- 1836 430 Denman, Capt. the Hon. Jos., R.N. 17, *Eaton-terrace, S.W.; and H.M. Yacht.*
- 1833 *Derby, Edward Geoffrey, Earl of, P.C., F.L.S. 23, *St. James's-square, S.W.; and Knowsley-park, Prescott, Lancashire.*
- 1854 *Devaux, Alexander, Esq. 2, *Avenue-road, Regent's-park, N.W.*
- 1860 Devine, Thomas, Esq., Chief of Surveys. *Quebec, Upper Canada.*
- 1837 *Devonshire, William Cavendish, Duke of, LL.D., D.C.L., M.A., F.R.S. *Devonshire-house, Piccadilly, W.; and Hardwicke-hall, Derbyshire.*
- 1862 Dick, Capt. Charles Cramond. *Exeter, Devon.*
- 1861 Dick, Robert Kerr, Esq., Bengal Civil Service. *Oriental Club, W.*
- 1833 Dickenson, John, Esq., F.R.S., F.S.A. 39, *Upper Brook-street, W.; and Abbott's-hill, Hemel-Hempstead.*
- 1852 Dickenson, John, Esq., jun. *Clarence-chambers, 12, Haymarket, S.W.; and Abbott's-hill, Hemel-Hempstead.*
- 1854 *Dickenson, Sebastian Stewart, Esq., Barrister-at-Law. *Brown's-hill, Stroud, Gloucestershire.*
- 1860 440 Dickinson, Rev. C. S. Allen, B.A.
- 1830 *Dickinson, Francis Henry, Esq., F.S.A. 8, *Upper Harley-street, W.; and Kingweston-park, Somerset.*
- 1860 Dickinson, Jas. Austen, Esq. 56, *Upper Bagot-street, Dublin.*
- 1859 Dickson, A. Benson, Esq. *Chapel-stairs, Lincoln's-inn, W.C.*
- 1858 Dickson, Charles Hammer, Esq. *H.B.M. Consul, Sukum Kalé, Black Sea.*
- 1860 Dickson, Lieut.-Col. Lothian Sheffield. 10, *Stanhope-terrace, Hyde-park, W.*
- 1843 Dickson, Peter, Esq. 28, *Upper Brook-street, W.*
- 1860 Dietz, Bernard, Esq., of Algoa Bay. 3, *Dorset-square, W.*
- 1859 Digby, G. Wingfield, Esq. 35, *Brook-street, Grosvenor-square, W.; and Sherborne-castle, Dorset.*
- 1860 Digby, Lieut.-Col. John Almerus. *Chalmington-house, Cattistock, Dorchester.*
- 1836 450 *Dilke, Charles Wentworth, Esq. 76, *Sloane-street, S.W.*
- 1845 *Dilke, Sir Charles Wentworth, Bart. 76, *Sloane-street, S.W.*
- 1859 *Dilke, Charles Wentworth, Esq. 76, *Sloane-street, S.W.*

Year of Election	
1856	Dillon, the Hon. Arthur. 17, <i>Clarges-street</i> , W.
1840	*Divett, Edward, Esq., M.P. <i>Bystock, near Exmouth, Devon.</i>
1861	Dixon, Lieut.-Colonel John. 4, <i>Craig's-court</i> , S.W.
1854	Dixon, W. Hepworth, Esq., F.R.S. <i>Essex-villa, Queen's-road, St. John's-wood</i> , N.W.
1857	Dobie, John, Esq., R.N. <i>Junior United Service Club, S.W.</i> ; and <i>Club-chambers, S.W.</i>
1857	Dobie, Robert, Esq., M.D., R.N. 7, <i>Houghton-pl., Amptill-sq., Hampstead-rd.</i> , N.W.
1841	*Dodd, George, Esq., F.R.S. 9, <i>Grosvenor-place</i> , S.W.
1854	460 Dodson, John George, Esq., M.P. 6, <i>Seamore-place, Mayfair</i> , W.
1862	Dolben, Commr. Wm. Digby Mackworth, R.N. <i>H.M.S. 'Bloodhound,' W. Coast of Africa.</i>
1854	*Dollond, George, Esq. <i>St. Paul's-churchyard, E.C.</i>
1854	Domville, William T., Esq., M.D., R.N. <i>Army and Navy Club, S.W.</i>
1853	Donaldson, Sir Stuart A. 22, <i>Rutland-gate, S.W.</i> ; and <i>Sydney, Australia.</i>
1858	Donne, John, Esq. <i>Instow, North Devon.</i>
1861	Donoughmore, R. J. Hely-Hutchinson, Earl of. 52, <i>South Audley-street, W.</i> ; <i>Knocklofty-house, Tipperary</i> ; and <i>Palmerston-house, near Dublin.</i>
1850	Dover, John William, Esq. 124, <i>Fenchurch-street, E.C.</i>
1854	Dower, John, Esq. 108, <i>Fleet-street, E.C.</i>
1853	Doyle, Sir Francis Hastings C., Bart. <i>Custom-house, E.C.</i>
1845	470*Drach, Solomon Moses, Esq., F.R.S. 39, <i>Holland-street, Fitzroy-square, W.</i>
1846	Drummond, Lieut.-General John. <i>The Boyce, Dymock, Gloucestershire.</i>
1846	Drury, Capt. Byron, R.N. <i>The Thicket, Southsea.</i>
1851	*Du Cane, Major Francis, R.E. 64, <i>Lowndes-square, S.W.</i>
1851	*Ducie, Henry John, Earl, F.R.S. 30, <i>Prince's-gate, S.W.</i>
1859	Ducket, Clark A., Esq., M.D., Surg. R.N. <i>H.M.S. 'Geyser,' and 33, South-down-road, Great Yarmouth.</i>
1859	Duckworth, Henry, Esq. 2, <i>Gambier-terrace, Liverpool.</i>
1862	Duff, A. Groves, Esq., M.D., Assist.-Surg. Bengal Army. 1, <i>Buckingham-terrace, Edinburgh</i> ; and <i>Oakmount, Lasswade, N.B.</i>
1860	*Duff, Mountstuart Elphinstone Grant, Esq., M.P. <i>Eden, near Banff, Scotland.</i>
1863	Duncan, Lieut. Francis, R.A., M.A., F.R.S. <i>Woolwich, S.E.</i>
1861	480*Duncan, George, Esq. 45, <i>Gordon-square, W.C.</i>
1840	*Dundas, Right Hon. Sir David, Q.C. 13, <i>King's-Bench-walk, Temple, E.C.</i> ; and <i>Ochertyre, Co. Perth.</i>
1860	Dunell, Henry James, Esq. 4, <i>Upper Hyde-park-gardens, W.</i>
1859	*Dunlop, R. H. Wallace, Esq., C.B., Indian Civil Service.
1860	*Dunmore, Charles Adolphus Murray, Earl of. 17, <i>Carlton-house-terrace, S.W.</i>
1837	*Dunraven, Edwin Richard, Earl of, F.R.S. <i>Adare-memor, Limerick</i> ; and <i>Dunraven-castle, Glamorganshire.</i>
1856	Duprat, Chevalier Alfredo. <i>H.M.F. Arbitrator, Cape Town, Cape of Good Hope</i> ; and 25, <i>Palace-gardens-terrace, Kensington, S.W.</i>
1861	Dupr��, Thos. W., Esq., M.D. <i>Panama.</i>

Year of
Election.

- 1852 D'Urban, Colonel W. J. *Deputy Quartermaster-General, Canada; and Junior U. S. Club, S.W.*
- 1861 Dyke, Commander Peché H., R.N. 3, *Southwick-place, Hyde-park, W.*
- 1858 490 Eardley, Sir Culling E., Bart. 11, *Grosvenor-street, W.; and Bedwell-park, Hatfield.*
- 1857 Eardley, E. G. Culling, Esq. *Hungershall-park, Tunbridge-Wells.*
- 1854 Eardley-Wilmot, Capt. A. P., R.N., C.B. *H.M.S. 'Nile,' Queenstown.*
- 1856 Eardley-Wilmot, Col. F., M.B.A. *Bridge, Canterbury.*
- 1857 Eastwick, Captain W. J. 12, *Leinster-terrace, Hyde-park, W.*
- 1862 *Eaton, Henry William, Esq. 16, *Prince's-gate, Hyde-park, S.*
- 1861 Eber, General F. 33, *St. James's-square, S.W.*
- 1862 Ebury, Lord. 107, *Park-street, Grosvenor-square, W.; and Moor-park, Herts.*
- 1862 Eden, Rear-Adm. Charles, C.B. *Admiralty, S.W.; and 20, Wilton-place, S.W.*
- 1858 Edge, Rev. W. J., M.A. *Benenden-vicarage, near Staplehurst, Kent.*
- 1861 500 *Edwards, Henry, Esq. 53, *Berkeley-square, W.*
- 1860 Edwards, Major James B., R.E. *Junior United Service Club, S.W.*
- 1860 Egerton, Colonel the Hon. Arthur. *Bridgewater-house, S.W.*
- 1857 Egerton, Commander Charles Randell, R.N. 7, *Rutland-gate, S.W.*
- 1853 Egerton, Captain the Hon. Francis, R.N. *Bridgewater-house, S.W.; and H.M.S. 'St. George.'*
- 1860 Elderton, Edward M., Esq. 40, *St. George's-road, Pimlico, S.W.*
- 1859 Elgin and Kincardine, James Bruce, the Earl of, K.T., G.C.B., Governor-General of India. *Athenæum Club, S.W.; and Broom-hall, Dunfermline.*
- 1862 Elkington, Lieut.-Col. J. H. F. *Army and Navy Club, S.W., and Park-street, Bath.*
- 1845 Ellenborough, Edward, Earl of, G.C.B. 110, *Eaton-square, S.W.; and Southam-house, near Cheltenham.*
- 1860 Elliot, George, Esq., C.B. *The Hall, Houghton-le-Spring, near Fence Houses, Durham.*
- 1830 510 *Elliott, Rev. Charles Bollean, M.A., F.R.S. *Tuttingstone, Suffolk.*
- 1861 Ellis, Rev. William. *Madagascar.*
- 1858 Elphinstone, Major Howard C., R.E. *Buckingham-palace, S.W.*
- 1857 Elton, Sir Arthur H., Bart. *Athenæum Club, S.W.; and Clevedon-court, Somersetshire.*
- 1862 *Emanuel, Harry, Esq.
- 1862 Emslie, John, Esq. 10, *Gray's-inn-terrace, W.C.*
- 1830 Enderby, Charles, Esq., F.R.S., F.L.S. 13, *Great St. Helen's, E.C.*
- 1860 Enfield, Edward, Esq., F.S.A. 19, *Chester-terrace, Regent's-park, N.W.*
- 1856 Entwisle, John, Esq. 1, *Russell-square, W.C.*
- 1861 Erroll, William Harry Hay, Earl of. 3, *Grafton-street, W.; Pembroke-lodge, Richmond-park, S.W.; and Staines-castle, Aberdeenshire.*
- 1863 520 *Erskine, Henry David, Esq. *Travellers' Club, S.W.; and 108, Gloucester-place, Portman-square, W.*

Year of Election.	
1852	Erskine, Rear-Admiral John Elphinstone, C.B. <i>H.M.S. 'Edgar'; 1 L, Albany, W., and Cardross, Stirling, N. B.</i>
1857	*Esmacale, G. M. M., Esq. 29, <i>Park-street, Grosvenor-square, W.</i>
1850	Espinasse, Major J. W., 12th Regt. <i>Spike-island, Queenstown, Ireland.</i>
1851	Evans, Rev. Charles. <i>King Edward VI. Grammar School, Birmingham.</i>
1857	Evans, Frederic J., Esq., R.N., F.R.A.S. 4, <i>Wellington-terrace, Charlton, Blackheath, S.E.</i>
1830	*Evans, Rear-Admiral George. 1, <i>New-street, Spring-gardens, S.W.; and Englefield-green, Chertsey.</i>
1857	Evans, Thos. Wm., Esq., M.P. 1, <i>Dartmouth-street, Westminster, S.W.; and Allestree-wall, Derby.</i>
1830	*Evans, W. Esq.
1861	Evelyn, Lt.-Colonel George P. <i>Army and Navy Club, S.W.</i>
1851	530 *Evelyn, William J., Esq., F.S.A. <i>Wotton-house, near Dorking.</i>
1845	*Everest, Sir Geo., Bengal Art., C.B., F.R.S., &c. 10, <i>Westbourne-street, Hyde-park, W.</i>
1830	*Everett, James, Esq., F.S.A.
1859	Ewart, William, Esq., M.P. 6, <i>Cambridge-square, W.</i>
1856	Ewing, J. D. Crum, Esq. 21, <i>Birch-lane, E.C.</i>
1857	Eyre, Edward J., Esq., Lt.-Gov. of Antigua.
1861	Eyre, George E., Esq. 59, <i>Locandes-square, S.W.</i>
1856	Eyre, Col. Vincent, C.B. <i>Athenaeum Club, S.W.; and India.</i>
1861	Fairbairn, William, Esq., C.E., F.R.S. <i>Manchester.</i>
1857	Fairholme, Lieut. Chas., R.N. <i>H.M.S. 'Megara'; and York-ter., Leamington.</i>
1856	540 Fairholme, George Knight, Esq. <i>Union Club, S.W.; and Ravenswood, Melrose, N.B.</i>
1838	Falconer, Thomas, Esq. <i>Usk, Monmouthshire.</i>
1857	Falkland, Lucius Bentinck, Viscount. <i>Skutterakelfe, Yorkshire.</i>
1855	*Fanshawe, Capt. E. G., R.N. 27, <i>Rutland-gate, Hyde-park, S.W.</i>
1857	Farrer, Thomas H., Esq. <i>Board of Trade, S.W.; and 21, Chester-terrace, Regent's-park, N.W.</i>
1853	*Fayrer, Joseph, Esq., M.D. <i>Calcutta.</i>
1858	Fazakerley, J. N., Esq. 17, <i>Montagu-street, Portman-square, W.</i>
1856	Ferguson, William, Esq. 2, <i>St. Aidan's-terrace, Birkenhead.</i>
1840	*Fergusson, James, Esq., F.R.A.S. 20, <i>Langham-place, W.</i>
1860	Ferro, Don Ramon de Silva, Chilian Consul General. 43, <i>Moorgate-street, E.C.</i>
1830	550 Findlay, Alexander, Esq. <i>Hayes, Kent, S.E.</i>
1844	Findlay, Alex. George, Esq. 53, <i>Fleet-street, E.C.; and Hayes, Kent, S.E.</i>
1862	Finnis, Thomas Quesed, Esq., Alderman. <i>Wanstead, Essex, N.E.</i>
1859	Fisher, Anthony L., Esq., M.D. 14, <i>York-place, Baker-street, Portman-square, W.</i>
1859	Fisher, Robert L., Esq. 49, <i>St. James's-street, S.W.</i>
1861	Fitton, Edward B., Esq. 6, <i>Gloucester-crescent, Hyde-park, W.</i>
1857	*Fitzclarence, Lieut. the Hon. George, R.N. <i>Albany-chambers, W.</i>

Year of
Election.

- 1861 Fitzgerald, Captain Keane. 2, *Portland-place, W.*
- 1860 Fitzmaurice, Lieut. the Hon. Frederick. 6, *Prince's-square, W.*
- 1859 Fitz-Roy, George Henry, Esq. 51, *Portland-place, W.*
- 1830 560 Fitz-Roy, Rear-Admiral Robert, F.R.S. *Board of Trade, S.W.; Athenæum Club, S.W.; and 38, Onslow-sq., Brompton, S.W.*
- 1857 Fitzwilliam, the Hon. C. W., M.P. 60, *St. James's-street, S.W.*
- 1837 *Fitzwilliam, William Thomas, Earl. 4, *Grosvenor-square, W.; and Wentworth-house, Rotherham, Yorkshire.*
- 1861 *Fleming, John, Esq. 7, *Mincing-lane, E.C.*
- 1853 *Flemyng, Rev. Francis P. *Glenfeulan, near Helensburgh, Glasgow.*
- 1862 Fletcher, John, Esq. *Dale-park, Arundel; and Eaton-place, S.W.*
- 1857 Fletcher, Thomas Keddey, Esq. *Union-dock, Limehouse, E.*
- 1861 Foord, John Bromley, Esq. 52, *Old Broad-street, E.C.*
- 1860 Forbes, Commander Charles S., R.N. *Army and Navy Club, S.W.*
- 1860 Forbes, the Hon. Horace Courtenay. 4, *St. Andrew's-place, Regent's-park, N.W.*
- 1845 570 Forster, Rev. Charles, B.D. *Stisted-rectory, Essex.*
- 1839 *Forster, William Edward, Esq. *Burley, near Otley.*
- 1861 Forsyth, William, Esq., Q.C. 61, *Rutland-gate, S.W.*
- 1858 Fortescue, Chichester S., Esq., M.P. 45, *St. James's-place, S.W.*
- 1861 *Fortescue, Hon. Dudley F., M.P. 17, *Grosvenor-square, W.*
- 1841 *Fowler, Rear-Admiral Robert M. *Walliscote-house, Pangbourne.*
- 1850 *Fowler, Robert N., Esq., M.A. 50, *Cornhill, E.C.; and Tottenham, N.*
- 1861 Fox, Arthur Douglas, Esq., C.E. 20, *Clarges-street, Mayfair, W.; and 8, New-street, Spring-gardens, S.W.*
- 1859 Fox, Lieut.-Colonel A. Lane. *Assistant Quartermaster-General, Cork.*
- 1830 *Fox, Lt.-Gen. C. R. *Travellers' Club, S.W.; and 1, Addison-rd., Kensington, W.*
- 1860 580 Fox, Thos., Esq., M.D. *Inspector-General of Hospitals, North Camp, Aldershot.*
- 1862 Franklin, Joseph Lewis, Esq. 7, *Albemarle-street, W.*
- 1860 Franks, Charles W., Esq. 5, *John-street, Berkeley-square, W.*
- 1854 Fraser, Charles, Esq. 38, *Conduit-street, W.*
- 1860 Fraser, Thomas, Esq. *Literary Secretary, Hudson Bay Company, Hudson-bay-house, E.C.*
- 1860 Freeman, Daniel Alexander, Esq., Barrister-at-law. *Upper Tooting, S.*
- 1859 Freeman, H. Stanhope, Esq. *Governor and Commander-in-Chief, Lagos, W. Africa; and 4, Royal-crescent, Notting-hill, W.*
- 1862 Fremantle, Vice-Admiral Sir Charles Howe, K.C.B. 57, *Grosvenor-street, Grosvenor-square, W.*
- 1863 Fremantle, Commander Edmund Robert, R.N. 4, *Upper Eccleston-street, S.W.*
- 1856 Fremantle, Rt. Hon. Sir Thomas F., Bart. 4, *Upper Eccleston-street, Belgrave-square, S.W.*
- 1852 590 French, Dr. James, C.B. *Inspector-General of Hospitals, Graham's Hotel, Edinburgh.*
- 1850 Frere, Bartle John Laurie, Esq. 45, *Bedford-square, W.C.*
- 1839 *Frere, George, Esq., jun. *Cape of Good Hope; and 45, Bedford-square, W.C.*

Year of Election.	
1842	Frere, William Edw., Esq., F.R.A.S. <i>Bombay</i> ; and 45, <i>Bedford-square, W.C.</i>
1853	Frith, John Griffith, Esq. 13, <i>Wimpole-street, W.</i> ; and 11, <i>Austin Friars, E.C.</i>
1859	Fryer, William, Esq. 39, <i>Marlborough-hill-gardens, St. John's Wood, N.W.</i>
1863	Fudge, William, Esq. 5, <i>Park-rose, Bristol.</i>
1855	Fuller, John, Esq.
1860	Fussell, Rev. J. G. Curry. 16, <i>Cadogan-place, S.W.</i>
1861	Fynes Clinton, Rev. Charles J., M.A. 39, <i>Bedford-square, W.C.</i> ; and <i>Cromwell, Notts.</i>
1855	600*Gabriel, Edmund, Esq. <i>H.M.'s Commissioner, St. Paul de Loando</i> ; and 44, <i>Charing-cross, S.W.</i>
1845	*Gage, Admiral Sir William Hall, G.C.H., K.C.B. <i>Thurston-cottage, Bury St. Edmund's, Suffolk.</i>
1858	Gaisford, Thomas, Esq. <i>Travellers' Club, S.W.</i>
1861	Gallagher, John, Esq., M.D. <i>Reform Club, S.W.</i> ; and 109, <i>Westbourne-terrace, W.</i>
1855	*Galloway, John James, Esq.
1848	*Galton, Capt. Douglas, R.E. 12, <i>Chester-street, Grosvenor-place, S.W.</i>
1850	*Galton, Francis, Esq., M.A., F.R.S. 42, <i>Rutland-gate, S.W.</i> ; and 5, <i>Bertie-terrace, Leamington.</i>
1854	*Gammell, Major Andrew. <i>Drumtochty, Kincardineshire, N.B.</i>
1859	Gammie, George, Esq. <i>Shotover-house, Wheatley, Oxon.</i>
1861	Garden, Robert Jones, Esq. 63, <i>Montagu-square, W.</i>
1833	610 Gascoigne, Capt., Ceylon Rifles. <i>Athenarum Club, S.W.</i>
1859	*Gassiot, John P., Jun., Esq. 6, <i>Sussex-place, Regent's-park, N.W.</i>
1858	Gausson, William, Esq. 12, <i>Montagu-place, Russell-square, W.C.</i>
1838	*Gawler, Colonel George, K.H. <i>United Service Club, S.W.</i> ; and 4, <i>Beresford-place, Southsea.</i>
1859	Gerstenberg, Isidore, Esq. 11, <i>Warnford-court, Throgmorton-street, E.C.</i>
1859	*Gibbs, H. Hucks, Esq. <i>St. Dunstan's, Regent's-park, N.W.</i>
1857	Gilchrist, John, Esq. 48, <i>Porchester-terrace, W.</i>
1855	Gillespie, Alexander, Esq. <i>Heathfield, Hersham, Esher, Surrey.</i>
1857	Gillespy, Thomas, Esq. <i>Brabant-court, Philpot-lane, E.C.</i>
1863	*Gillett, William, Esq. 28, <i>Bedford-square, W.C.</i>
1861	620 Gilliat, Alfred, Esq. <i>Longham-house, near Wimborne, Dorset.</i>
1863	Gillies, Robert, Esq., C.E. <i>Dunedin, Otago, New Zealand.</i>
1836	Gladish, William, Esq. <i>Bycliffes, Gravesend.</i>
1862	*Gladstone, Robert Stuart, Esq. 11, <i>New Broad-street, E.C.</i>
1846	*Gladstone, William, Esq. 57½, <i>Old Broad-street, E.C.</i>
1860	Glascott, Lieut. Adam Giffard, R.N., Acting Commissioner on the Turko-Persian Frontier. <i>British Embassy, St. Petersburg.</i>
1857	Gleig, Rev. G. R., M.A. <i>Chaplain-General, Chelsea-hospital, S.W.</i>
1854	Glen, Joseph, Esq., Mem. Geogr. Soc. of Bombay. <i>Oriental Club, W.</i>
1857	Glover, Lieut. John H., R.N. <i>Lagos</i> ; and <i>Army and Navy Club, S.W.</i>
1860	Glyn, Capt. H. Carr, R.N. 1, <i>Eccleston-street, Belgrave-square, S.W.</i>

Year of
Election.

- 1862 630 Goddard, James, jun., Esq. 14, *Mincing-lane, E.C.*
 1858 Goldsmid, Frederick D., Esq. 20, *Portman-square, W.*
 1863 Goldsmid, Major Frederick John. *Southborough, Kent; and United Service Club, S.W.*
 1861 Goldsmid, Julian, Esq. 20, *Portman-square, W.*
 1861 Gooldin, Joseph, Esq. 22, *Leinster-gardens, Hyde-park, W.*
 1860 Gooch, Thomas Longridge, Esq. 101, *Inverness-terrace, Baywater, W.*
 1856 Gordon, Alexander, Esq., C.E. 37a, *Sutherland-street, Finsbury, S.W.*
 1856 *Gordon, Colonel the Hon. Alexander H., C.B. *Argyll-house, Regent-street, W.*
 1860 Gordon, the Honourable Arthur. 7, *Argyll-street, W.*
 1858 Gordon, Capt. Charles G., R.E. *Hong-Kong, China.*
 1860 640 Gordon, Rev. Cosmo Reid, M.A., F.S.A. 9, *Greenhill-st., Greenheys, Manchester.*
 1854 Gordon, Harry George, Esq. 1, *Clifton-place, Hyde-park-gardens, W.; and Killychassi, Dunkeld, Perthshire.*
 1856 Gordon, Vice-Admiral the Honourable John. 28, *Queen Anne-street, W.*
 1853 Gordon, Vice-Admiral Robert. *United Service Club, S.W.*
 1853 Gere, Montagu, Esq. *Palace-chambers, 88, St. James's-street, S.W.*
 1853 Gore, Richard Thomas, Esq. 6, *Queen-square, Bath.*
 1853 Gorman, John, Esq., M.D. 39, *Harewood-square, N.W.*
 1859 Gosling, Fred. Solly, Esq. 18, *New-street, Spring-gardens, S.W.*
 1862 Goss, Samuel Day, Esq., M.D. 24, *Newington-place, Kennington-park.*
 1855 Gould, Lieut.-Colonel Francis A., R.E. *Buntingford, Herts.*
 1846 650 Gould, John, Esq., F.R.S., F.L.S. 26, *Charlotte-street, Bedford-square, W.C.*
 1860 Gould, Nathaniel, Esq., F.S.A. 4, *Tavistock-square, W.C.*
 1858 Graham, Cyril C., Esq. 9, *Cleveland-row, St. James's, S.W.; and Debroe-house, Watford, Herts.*
 1861 Grant, Alexander, Esq. *Oakfield House, Hornsey, N.*
 1861 Grant, Daniel, Esq. 11, *Warwick-road, Upper Clapton, N.*
 1860 Grant, Capt. James A. *Dingwall, Ross-shire, N.B.; and East African Expedition.*
 1861 Grant, Colonel W. L., care of Capt. Ellis, *Army and Navy Club, S.W.*
 1860 Grantham, Capt. James, R.E. *Scoby, Brigg, Lincolnshire; and Royal Engineer Office, Devonport.*
 1830 *Gray, John Edw., Esq., M.D., F.R.S., Z.S. and L.S. *British Museum, W.C.*
 1862 Greathead, Lieut.-Col. Wilberforce, W. H., C.B. *Horse Guards, Whitehall, S.W.*
 1861 660 Green, Capt. Francis. *South Camp, Aldershot; and 89, Eccleston-square, S.W.*
 1830 Greene, Thomas, Esq. *Whittington-hall, near Burton, Westmoreland.*
 1857 *Greenfield, W. B., Esq. 59, *Porchester-terrace, Hyde-park, W.; and Union Club, S.W.*
 1858 *Gregory, Augustus Chas., Esq. *Sydney.*
 1858 Gregory, Charles Hutton, Esq., C.E. 1, *Delahay-street, Westminster, S.W.*
 1860 Gregory, Francis Thomas, Esq. *Survey Department, W. Australia; and Castle-hill, Wycombe.*
 1858 *Gregory, Isaac, Esq. *Chorlton Hall, Victoria-park, Manchester.*
 1861 *Gregson, Samuel, Esq., M.P. 32, *Upper Harley-street, W.*

Year of
Election.

- 1857 *Grellet, Henry Robert, Esq. 7, *Lloyd-street, Lloyd-square, E.C.*
 1859 Grenfell, Chas. Pascoe, Esq., M.P. 38, *Belgrave-square, S.W.*
 1858 670 Grenfell, Pascoe St. Leger, Esq. *Maesteg-house, Swansea.*
 1853 Grenfell, Riversdale W., Esq. 27, *Upper Thames-street, E.C.*
 1830 *Greswell, Rev. Richard, M.A., F.R.S. 39, *St. Giles, Oxford.*
 1837 *Grey, Sir George, K.C.B. *Governor & Commander-in-Chief, New Zealand.*
 1844 *Grey, Ralph Wm., Esq., Commissioner of Customs. 47, *Belgrave-sq., S.W.;*
and Chipchase-castle, Hexham.
 1862 Griffin, James, Esq. *Queen-street, Portsea; and Coslam, Hants.*
 1861 *Griffith, Daniel Clewin, Esq. 10, *Gower-street, W.C.*
 1839 Griffith, John, Esq. 16, *Finsbury-place South, E.C.*
 1836 Griffith, Richard Clewin, Esq. 10, *Gower-street, W.C.*
 1859 Grimston, the Hon. and Rev. Francis S. *Wakes Colne, Halstead.*
 1855 680 Grindrod, R. B., Esq., M.D., LL.D., F.L.S., &c. *Townsend-house, Malvern.*
 1861 Grosvenor, Lord Richard. 33, *Upper Grosvenor-street, W.*
 1858 Grote, George, Esq. 12, *Savile-row, W.*
 1857 Gruneisen, Charles Lewis, Esq. 16, *Surrey-street, Strand, W.C.*
 1862 Gunn, F. L. G., Esq., M.D., Army Medical Staff; *Bathurst, Gambia, W. Africa.*
 1861 Gunnell, Commander Edmund H., R.N. *Army and Navy Club, S.W.; 21,*
Argyll-road, Campden-hill, W.
 1830 *Gurney, Hudson, Esq., F.R.S., F.S.A., F.R.S.N.A. 9, *St. James's-square, S.W.;*
and Keswick-hall, near Norwich.
 1859 *Gurney, John H., Esq., M.P. 24, *Kensington-palace-gardens, W.*
 1857 Gurney, Samuel, Esq., M.P. 25, *Prince's-gate, Hyde-park, S.W.; and*
Carshalton, Surrey.
 1362 Guthrie, James Alexander, Esq. 30, *Portland-place, W.*
 1860 690 Haliday, Lt.-Col. William Robert. *United Service Club, S.W.*
 1853 *Halkett, Rev. Dunbar S. *Little Bookham, Surrey.*
 1853 *Halkett, Lieut. Peter A., R.N. *Windham Club, S.W.*
 1861 Hall, Charles Hall, Esq. 10, *Mansfield-st., W.; and Watergate, near Emscorth.*
 1862 Hall, James Tebbutt, Esq. *Fore-street, Linchouse, E.; and 3, Crane-grove,*
Holloway, N.
 1853 Hall, Captain William Hutcheson, R.N., C.B., F.R.S. *United Service Club,*
S.W.; and 48, Phillimore-gardens, Kensington, W.
 1856 Halloran, Alfred L., Esq., Master R.N. *Tumerton Folliot, near Plymouth.*
 1858 Halloran, Arthur B., Esq. *Principal of the South Devon Collegiate School,*
Heavitree, Exeter.
 1862 Hamilton, Archibald, Esq. *South Barrow, Bromley, Kent, S.E.*
 1861 Hamilton, Lord Claude. 19, *Eaton-sq., S.W.; and Barons-court, Co. Tyrone.*
 1857 700 Hamilton, Edward, Esq., M.D. 22, *Grafton-street, W.*
 1857 Hamilton, Edward Terrick, Esq. 32, *Upper Brook-street, W.*
 1830 *Hamilton, Capt. Henry G., R.N. 71, *Eccleston-square, S.W.*
 1861 Hamilton, Capt. Robert William, Grenadier Guards. 18, *Eccleston-square, S.W.*

Year of
Election.

- 1830 Hamilton, Terrick, Esq. 121, *Park-street, Grosvenor-square, W.*
- 1846 Hamilton, Rear-Admiral W. A. Baillie. *Macartney-house, Blackheath, S.E.*
- 1837 Hamilton, Wm. John, Esq., F.R.S. 23, *Chesham-place, S.W.*
- 1858 Hammond, Rev. J. W., B.D., Fellow of St. John's College, Oxford. *Reform Club, S.W.*
- 1862 *Hanbury, Robert, Esq., M.P. 10, *Upper Grosvenor-street, W.*
- 1853 *Hand, Captain George S., R.N. *United Service Club, S.W.; and H.M.S. 'Sampson.'*
- 1860 710 *Handley, Benjamin, Esq., Assistant-Commr. Turko-Persian Frontier. *British Embassy, St. Petersburg.*
- 1861 *Hankey, Blake Alexander, Esq. 38, *Portland-place, W.*
- 1857 Hankey, Thomson, Esq., M.P. 45, *Portland-place, W.*
- 1837 *Hanmer, Sir J., Bart., M.P., F.R.S. *Hanmer-hall and Bettisfield-park, Flintshire.*
- 1859 *Hansard, Henry, Esq. 14, *Park-square, Regent's-park, N.W.*
- 1840 *Harcourt, Egerton V., Esq. *Whitwell-hall, York.*
- 1853 Harcourt, Rear-Admiral Octavius Vernon. 29, *Devonshire-place, Portland-place, W.; and Swinton-park, Bedale, Yorkshire.*
- 1861 Hardinge, Henry, Esq., M.D. 18, *Grafton-street, Bond-street, W.*
- 1862 Hardman, William, Esq., M.A. 27, *Gordon-street, Gordon-square, W.C.*
- 1855 Harris, the Hon. and Rev. C. A. *Rounham's-parsonage, Southampton.*
- 1853 720 Harris, Capt. the Hon. E. A. J., R.N. *H.B.M.'s Minister Plenipotentiary, Berne.*
- 1852 Harris, George Frederick, Esq., M.A. *Harrow-park, Middlesex, N.W.*
- 1859 Harris, Capt. Henry, R.C.S. 35, *Gloucester-terrace, Hyde-park, W.*
- 1859 Harrison, C. H. Rogers, Esq., F.R.C.S. 13, *Lansdowne-road, Clapham-road, S.*
- 1838 Harrowby, Dudley, Earl of. *Sandon-ho., Lichfield; and Norton, Gloucestershire.*
- 1854 *Hartland, Frederick D., Esq., F.S.A., &c. *The Oaklands, near Cheltenham.*
- 1863 Harvey, Charles, Esq. *Rathgate-cottage, Streatham, S.*
- 1846 Harvey, W. S., Esq., R.N. *H.M.S. 'Hannibal,' Mediterranean; and 14, Great George-street, S.W.*
- 1859 Harwood, H. Harwood, Esq. 29, *Cleveland-square, Hyde-park, W.*
- 1858 Hawker, Edward J., Esq. 37, *Cadogan-place, S.W.*
- 1834 730 Hawkins, Francis Bisset, Esq., M.D., F.R.S. 29, *Upper Harley-street, W.; and Levell-lodge, Dorchester.*
- 1857 Hawkins, Commander Frank K., R.N. *Army and Navy Club, S.W.*
- 1840 *Hawkins, John, Esq.
- 1858 *Hawkins, Lieut.-Col. J. Summerfield, R.E. *N.W. American Boundary Commission; and 2, Victoria-street, Westminster, S.W.*
- 1861 Hawksley, Thomas, Esq., C.E. 19, *Upper Woburn-place, Tavistock-sq., W.C.*
- 1860 Haworth, Frederick, Esq. 9, *Eccleston-street, S.W.*
- 1852 *Hay, Capt. Sir J. C. Dalrymple, Bart., R.N., M.P. *U. S. Club, S.W.; Dunragit, Glenlace; and Harrow-on-the-hill, N.W.*
- 1859 Hay, Major W. E. *Care of Lady Mary Hay, Linden-lodge, Loan-head, near Edinburgh.*
- 1853 Hayward, Robert Newton, Esq. *Porchester-villa, Grange-loan, Edinburgh.*
- 1862 Head, Alfred, Esq. *Craven-hill, Baywater, W.*

Year of Election.	
1859	740 Heard, G. G. Gilbert, Esq., F.S.A. 18, <i>Deconshire-terrace, Hyde-park, W.</i>
1856	Heath, J. Benjamin, Esq., F.R.S., F.S.A., Consul for Sardinia. 31, <i>Old Jewry, E.C.</i>
1861.	Hector, Alexander, Esq. 6, <i>Stanley-gardens, Bayswater, W.</i>
1861	Hector, James, Esq., M.D.
1859	Hellmann, Christian, Esq. <i>Club-chambers, Regent-street, S.W.</i>
1859	Hely, Hovendon, Esq. <i>Australian Club, Sydney.</i>
1862	Hemans, Geo. Willoughby, Esq., C.E. 13, <i>Queen's-square, Westminster, S.W.</i>
1856	Henderson, Andrew, Esq. 102, <i>Gloucester-place, Portman-square, W.</i>
1837	*Henderson, James, Esq. <i>Littlewood-park, Forbes, Aberdeenshire.</i>
1853	Henderson, John, Esq. <i>Conservative Club, S.W.; and Valparaiso.</i>
1852	750 Henderson, William, Esq. 5, <i>Stanhope-street, Hyde-park-gardens, W.</i>
1844	*Heneage, Edward, Esq. <i>Stag's-end, Hemel Hempstead.</i>
1861	Henn, Rev. J., B.A., F.G.S., Head Master of the Commercial Schools. <i>Stratford New-road, Manchester.</i>
1860	Hennessey, J. B. N., Esq. 1st Asst. Trig. Survey of India, <i>Dehra in the Dhoon, N.W. Provinces, India.</i>
1862	Henry, Capt. R. J. <i>Army and Navy Club, S.W.</i>
1838	*Henry, Wm. Chas., Esq., M.D., F.R.S. <i>Haffield, near Ledbury, Herefordshire.</i>
1861	*Henty, Douglas, Esq. <i>Chichester.</i>
1834	Herbert, Jacob, Esq. <i>Trinity-house, Tower-hill, E.C.</i>
1857	Herd, Captain D. J. 2, <i>Norway-house, Lincolns, E.</i>
1858	Hertalett, Edward, Esq. <i>Librarian, Foreign Office, S.W.; and Belle-vue-house, Richmond, S.W.</i>
1841	760 Hessey, James Augustus, Esq. <i>Manningford Bruce, Pewsey, Wilts.</i>
1861	Heugh, John, Esq. <i>Firwood, Alderley-edge, Cheshire.</i>
1858	Hewett, Capt. J. A. Napier. <i>Velindie-house, Trevine, Haverfordwest.</i>
1856	Hewitt, James, Esq. <i>Nutfield, Redhill.</i>
1859	Hewitt, Commander William Nathan Wright, R.N. <i>H.M.S. 'Viper,' W. Coast of Africa.</i>
1840	*Heywood, James, Esq., M.P., F.R.S. <i>Athenæum Club, S.W.; and 26, Kensington-palace-gardens, W.</i>
1860	Heyworth, Capt. Lawrence, 4th Royal Lancashire. <i>Jun. United Service Club, S.W.</i>
1853	Hickey, Edwin A., Esq. <i>Beech-hurst, Hayward's-heath.</i>
1856	Hill, Arthur Bowdler, Esq. <i>South-road, Clapham-park, Surrey, S.</i>
1857	Hill, Rev. Charles Cress. <i>Southfield, Clapham-park, Surrey, S.</i>
1854	770 Hill, Lieut.-Colonel Stephen J. <i>Army and Navy Club, S.W.; and Governor of Antigua.</i>
1861	Hilliard, Capt. George Towers, Madras Staff Corps. 43, <i>Upper Seymour-street, Portman-square, W.; and India.</i>
1858	Hinchliff, T. Woodbine, Esq., Barrister-at-Law. 64, <i>Lincoln's-inn-fields, W.C.</i>
1860	Hind, Professor Henry Youle, M.A. <i>Toronto, Canada West.</i>
1862	*Hinde, Samuel Henry, Esq. 130, <i>Piccadilly, W.</i>
1846	*Hindmarsh, Frederick, Esq. 17, <i>Bucklersbury, E.C.</i>
1861	Hoare, Deane John, Esq. <i>R. T. Y. Club, Albemarle-street, W.</i>

Year of
Election.

- 1846 Hobbs, J. S., Esq. 157, *Leadenhall-street, E.C.*
- 1855 Hobbs, Wm. Geo. Ed., Esq. *Master of Grammar School, Wareside, near Ware.*
- 1830 *Hobhouse, Henry William, Esq. 24, *Cadogan-place, S.W.*
- 1861 780 Hodgins, J. George, Esq., Chief Assist. Depart. of Public Instr. *Toronto, Upper Canada.*
- 1834 *Hodgkin, Thomas, Esq., M.D. 35, *Bedford-square, W.C.*
- 1856 *Hodgson, Arthur, Esq., Superintendent of the Australian Agricultural Company, *Drayton-hall, West Drayton, near Uxbridge.*
- 1861 Hodgson, Christopher Pemberton. 64, *Pall Mall, S.W.*
- 1861 Hodgson, James Stewart, Esq. 8, *St. Helen's-place, E.C.*
- 1857 Hodgson, Kirkman Daniel, Esq., M.P. 8, *St. Helen's-place, E.C.*
- 1856 Hogg, James, Esq., Jun. 18, *St. Andrew's-square, Edinburgh.*
- 1830 Hogg, John, Esq.; M.A., F.R.S., F.L.S., Foreign Sec. R. Soc. of Literature. 8, *Sergeants' Inn, Temple, E.C.; and Norton-house, Stockton-upon-Tees.*
- 1839 *Holford, Robert S., Esq., M.P. *Dorchester-house, Park-lane, W.*
- 1830 Holland, Sir Henry, Bart., M.D., F.R.S. 25, *Lower Brook-street, W.*
- 1861 790 Holland, Colonel James. 24, *Prince's-square, Kensington-gardens, W.*
- 1862 Holland, Robert, Esq. *Stannore-hall, Great Stanmore, Middlesex.*
- 1861 *Hollingsworth, John, Esq., M.R.C.S. *Berley-place, Greenwich, S.E.*
- 1861 Holme, J. Wilson, Esq., M.A. *Beckenham, Kent, S.E.*
- 1835 *Holmes, James, Esq. 4, *New Ormond-street, Queen-square, W.C.*
- 1862 Holmes, Sir William H. 4, *Southwick-place, Hyde-park, W.*
- 1861 Holms, John, Esq. 9, *Petersham-terrace, South Kensington, W.*
- 1839 *Holroyd, Arthur Todd, Esq., M.D., F.L.S. *Athenaeum Club, S.W.*
- 1857 Holroyd, Henry, Esq., Barrister-at-Law. 2, *Elm-court, Temple, E.C.*
- 1857 Homfray, Frederick Samuel, Esq., C.E. 6, *Storey's-gate, S.W.*
- 1857 800 Homfray, William Henry, Esq. 6, *Storey's-gate, S.W.*
- 1862 Hood, Henry Schuback, Esq. *War Office, S.W.; and 10, Kensington-park-gardens, W.*
- 1861 Hood, Thomas Hood, Esq. *Sydney.*
- 1859 *Hood, William Charles, Esq., M.D. *Bethlehem Hospital, S.*
- 1830 *Hooker, Sir Wm. J., K.H., Ph. D., LL.D., F.R.S., F.R.S.A., &c. *West-park, Kew, W.*
- 1861 Hopcraft, George, Esq. 3, *Billiter-square, E.C.*
- 1846 *Hope, Alex. James Beresford, Esq. *Arklow-house, Connaught-place, Hyde-park, W.; and Bedgebury-park, Hurst-green, Kent.*
- 1862 Hope, Capt. C. Webley, R.N. *Anglesey, Gosport.*
- 1857 Hoper, Richard, Esq. 53, *Margaret-street, Cavendish-square, W.; and Cowfold, Horsham, Sussex.*
- 1861 Hoskins, Commr. A. H., R.N. *Army and Navy Club, S.W.*
- 1853 810 Hoskins, George Alex., Esq. *Athenaeum Club, S.W.*
- 1859 Hoskyns, Chandos Wren, Esq. *Wrazhall-abbey, Warwickshire.*
- 1856 Hovell, William Hilton, Esq. *Goulburn, New South Wales.*
- 1853 Howard, Sir Ralph, Bart. 17, *Belgrave-sq., S.W.; and Bushy-park, Wicklow.*
- 1857 Heward, Samuel Lloyd, Esq. *Goldings, Loughton, Essex.*

Year of
Election.

- 1842 *Hubbard, J. Gellibrand, Esq., M.P. 24, *Prince's-gate, Hyde-park South, W.*
 1857 Hughes, Capt. Sir Frederic. *Ely-house, Wexford.*
 1838 Hughes, William, Esq. 48, *Thornhill-square, Islington, N.*
 1838 *Hume, Edmund Kent, Esq.
 1860 *Hume, Hamilton, Esq. *Cooma Pass, New South Wales.*
 1861 820 Hunt, George S. Lennor, Esq., H.B.M. Consul, *Pernambuco.*
 1857 Hunt, Zacharias Daniel, Esq. *Aylesbury.*
 1862 Hunter, Henry Lannoy, Esq. *Beech-hill, Reading.*
 1860 Huskisson, Wm. H. Tilghman, Esq. *Eartham, near Chichester.*
 1858 Hutchinson, Thomas J., Esq., H.M.B. Consul, *Rosario; and The Rosery, Broadway, Wexford.*
 1851 Hyde, James Bartlet, Esq. *Conservative Club, S.W.*
 1860 *Hyde, Captain Samuel. 8, *Billiter-square, E.C.*
- 1852 Illingworth, Richard Stonhewer, Esq. 9, *Norfolk-crescent, Hyde-park, W.*
 1850 *Imray, James Frederick, Esq. 102, *Minorities, E.; and Bethkenham, Kent, S.E.*
 1861 *Ingall, Samuel, Esq. 1, *Old Broad-street, E.C.; and Forest-hill, Kent, S.E.*
 1860 830 Ingilby, the Rev. Henry John. *Ripley-castle, Ripley, Yorkshire.*
 1851 Inglefield, Captain Edward A., R.N., F.R.S. *United Service Club, S.W.*
 1846 *Ingram, Hughes Francis, Esq. *University Club, S.W.*
 1860 *Inskip, G. H., Esq., Master R.N. *H.M. Surveying Vessel 'Seaflower,' and 23, Anne-street, Sunderland.*
 1852 *Inskip, Rev. Robert Mills. 8, *Boon's-place, Plymouth.*
 1840 *Irby, Frederick W., Esq. *Athenaeum Club, S.W.*
 1853 Irving, Thomas, Esq. 5, *Belitha-villas West, Barnsbury-park, N.*
 1862 *Irwin, James V. H. 7, *Hereford-square, Old Brompton, S.W.*
 1862 Isaac, Frederick N., Esq. *Old Bank, Worcester.*
- 1850 Jackson, William, Esq.
 1855 840 Jackson, William, Esq., M.P. *Fenton's Hotel, S.W.*
 1862 Jacomb, Thomas, jun., Esq. 23, *Old Broad-street, Gresham-house, E.C.*
 1857 James, Colonel Sir Henry, R.E., F.R.S. *Superintendent Ordnance Survey, Southampton.*
 1861 James, William Bosville, Esq. 13, *Blomfield-road, Maida-hill, W.*
 1859 *Janson, T. Corbyn, Esq. *Stamford-hill, N.*
 1862 Jaques, Leonard, Esq. *Easby-abbey, Richmond, Yorks.*
 1857 Jefferson, Richard, Esq. *Army and Navy Club, S.W.*
 1860 *Jejeebhoy, Sir Jamsetjee, Bart. *Bombay.*
 1854 Jellicoe, Charles, Esq. 23, *Chester-terrace, N.W.*
 1859 Jencken, H. Diedrich, Esq. 1, *Brick-court, Temple, E.C.; and 2, York-terrace, Upper Sydenham, S.E.*
 1854 850 Jenkins, Capt. Griffith, I.N., C.B. *East India Club, St. James's-square, S.W.; and Derwen, Welch Pool, Montgomeryshire.*
 1837 *Jenkins, R. Castle, Esq. *Beachley, near Chepstow.*

Year of
Election.

- 1854 *Jennings, William, Esq., M.A. 13, *Victoria-street, Westminster, S.W.*
- 1862 Jerdein, John, Esq. 2, *Stafford-street, Bond-street, W.*
- 1858 Jermyn, the Venerable Archdeacon Hugh Willoughby. *Nettlecome-rectory, near Tunstun, Somerset.*
- 1860 Jermyn, Rowland Formby, Esq. *War Office, S.W.*
- 1860 Jessopp, Rev. Augustus, M.A., Head Master, King Edward VI. School. *Norwich.*
- 1858 Johnson, Capt. Clement. *Carlton Club, S.W.; and 1, Whitehall, S.W.*
- 1847 Johnson, Edmund Chas., Esq. 20, *Arlington-street, S.W.; and 6, Savile-row, W.*
- 1859 *Johnson, Henry, Esq. 39, *Crutched-friars, E.C.*
- 1854 860 Johnson, John Hugh, Esq.
- 1861 Johnson, William, Esq., R.N. *R. T. Y. Club, 7, Albemarle-street, W.*
- 1843 Johnston, Alex. Keith, Esq., F.R.S.E., Hon. Mem. Berl. Geog. Soc., etc. *March-hall-park; and 4, St. Andrew-square, Edinburgh.*
- 1856 Johnston, A. R., Esq., F.R.S. *Athenaeum Club, S.W.; and 25, Mount-street, W.*
- 1857 Johnston, J. Brookes, Esq. 29, *Lombard-street, E.C.*
- 1858 Johnston, Capt. J. Gilbert. 8, *York-terrace, Regent's-park, N.W.*
- 1853 Johnstone, Sir John V. B., Bart., M.P., D.C.L. 27, *Grosvenor-square, W.; and Hackness-hall, near Scarborough.*
- 1858 Jones, Capt. Edward Monckton, 20th Regt. *Brigade Office, Dover.*
- 1851 Jones, Lieut.-General Sir Harry D., R.E., K.C.B. *R. M. College, Farnborough Station, Hants.*
- 1857 Jones, Capt. Jenkin, Bombay Engineers. 1, *Lennard-place, Circus-road, St. John's-wood, N.W.; and India.*
- 1862 870 Jones, John, Esq. 338, *Strand, W.C.*
- 1861 Jones, John Pryce, Esq. *Grove-park School, Wrexham.*
- 1861 Jones, Sir Willoughby, Bart. *Cranmer-hall, Fakenham, Norfolk.*
- 1863 Joshua, Mess, Esq. *Melbourne; and 22, Clifton-gardens, Maida-hill, W.*
- 1863 Jourdain, Frederick John, Esq. 10, *Austin-friars, E.C.*
- 1840 *Kalergi, John, Esq. 22, *Pará-lane, W.*
- 1855 Kane, Major Fred. A. C., 15th Regt. Bombay N.I. *Junior U. Service Club, S.W.*
- 1858 Kay, David, Esq.
- 1858 Keene, Edward Arthur, Lord. 16A, *Hill-street, Berkeley-square, W.; and Stetchworth-park, Newmarket.*
- 1860 Kente, R. W., Esq., Lieutenant-Governor, *Trinidad.*
- 1857 880 Keating, Sir Henry Singer, Q.C., M.P., one of the Judges of the Court of Common Pleas. 11, *Prince's-gardens, S.W.*
- 1857 Keene, Rev. C. E. Buck. *Sweynscombe-park, Henley-upon-Thames.*
- 1845 *Kellett, Br.-Adm. Henry, C.B. *Clonmel, Ireland.*
- 1861 Kelly, William, Esq. 6, *Belgrave-street South, Pimlico, S.W.; and 50, Rue des Viellards, Boulogne-sur-Mer.*
- 1860 *Kemball, Col. Arnold Burrowes, C.B., Indian Army. *H.M.'s Commi-General, Bagdad; and 6, Chester-place, Hyde-park, W.*
- 1860 Kendall, Henry, Esq., Consul for Peru. 11, *New Broad-street, E.C.; and The Limes, Mortlake, S.W.*

Year of Election.	
1861	Kennard, Adam Steinmetz, Esq. 4, Lombard-street, E.C.
1859	Kennard, Coleridge J., Esq. 14, Lombard-street, E.C.; and 13, Prince's-terrace, Prince's-gate, S.W.
1861	Kennard, Robert William, Esq., M.P. 37, Porchester-terrace, Hyde-park, W.
1861	Kennedy, Edward Shirley, Esq. Maidenhead.
1854	890 Kennedy, Rev. John, M.A. 4, Stepney-green, E.
1851	Kent, John, Esq. Shafston, Moreton-bay, Australia.
1862	Kershaw, Wm., Esq. 16, St. Mary Axe, E.C.; and Suffolk-lodge, Brixton-road, S.
1859	Key, Capt. Astley Cooper, R.N., C.B. United Service Club, S.W.
1862	Key, J. Binney, Esq. Essex-house, West-hill, Putney, S.W.
1857	Keysell, Francis P., Esq. Sycamore-villa, 35, Carlton-hill, St. John's-wood, N.W.
1846	King, Lieut.-Colonel Edward R., 36th Regt. Junior United Service Club, S.W.
1858	King, Rev. Samuel W., A.M. Saxlingham-rectory, Norwich.
1861	King, Major W. Ross, Unatt., F.S.A. Scot. Turtowie, Blackburn, Aberdeenshire.
1857	Kinkel, Gottfried, Esq., PH. DR. 23, Blomfield-road, Maida-hill, W.
1857	900* Kinnaird, Hon. Arthur F., M.P. 2, Pall-mall East, S.W.
1860	Kinns, Samuel, Esq., Phil. Dr., F.R.A.S. Highbury-new-park College, N.
1858	Kirk, John, Esq., M.D. Livingstone Expedition.
1861	Kirkland, Sir John. 17, Whitehall-pl., S.W.; and Foot's-cray-pl., Kent, S.E.
1835	*Kjaer, Thomas Andreas, Esq., Harbour-master. St. Thomas, West Indies.
1862	Knollys, Lieut.-General W. T., V.-Pres. Council of Military Education. Eaton-square, S.W.
1861	Knox, Thomas G., Esq. India.
1861	Kyd, Hayes, Esq., M.R.C.S. Wadebridge, Cornwall.
1859	Labrow, Valentine H., Esq. Mitre-court, Temple, E.C.
1860	Labuan, Right Rev. F. T. MacDougall, Bishop of. 4, Queen's-terrace, Queen's-gate, Kensington-gore, W.
1849	910* Laflin, Capt. Robert Michael, R.E. Army and Navy Club, S.W.; and Otham-lodge, Kent.
1859	Lamb, Lieut. Henry, I.N. 108, Leadenhall-street, E.C.
1863	*Lambert, Alan, Esq. 2, Portugal-street, South Audley-street, W.
1861	Lamont, James, Esq. Brooks's Club, S.W.
1838	*Lance, John Henry, Esq., F.L.S. The Holmwood, Dorking.
1861	Lane, Edward, Esq. Peninsular and Oriental S. N. Company, 122, Leadenhall-street, E.C.
1861	*Lang, Andrew, Esq. Dunmore, Hunter-river, N. S. Wales; and 35, Weymouth-street, Portland-place, W.
1859	*Lange, Daniel A., Esq. Egypt.
1856	Langler, J. R., Esq., Lecturer, Wesleyan Normal Institution. Westminster, S.W.
1833	*Larcom, Maj.-General Sir Thomas Aiskew, R.E., K.C.B., F.R.S. Castle, Dublin.
1861	920 Lardner, Col. John. United Service Club, S.W.
1859	Larnach, Donald, Esq. 21, Kensington-palace-gardens, W.
1854	Latrobe, Ch. J., Esq. Athenaeum Club, S.W.; and Whitbourne-court, Worcester.

Year of
Election.

- 1862 *Laurie, John M., Esq. 4, *St. George's-place, S.W.*; and *Marxwellton-house, Thornhill, Dumfriesshire.*
- 1846 *Law, the Hon. H. Spencer, M.A. 1, *Lowndes-st., S.W.*; and *Ellington-A., Ramsgate.*
- 1830 Law, William J., Esq. 63, *Upper Seymour-street, W.*; 33, *Lincoln's-inn-fields, W.C.*; and 5, *Sussex-square, Brighton.*
- 1861 Lawrence, Edward, Esq. 16, *Wellesley-terrace, Princess-park, Liverpool.*
- 1862 *Lay, Horatio, N., Esq., Commissioner of Foreign Customs in China. 119, *Gloucester-terrace, W.*
- 1857 Layard, Austen H., Esq., M.P., D.C.L. 130, *Piccadilly, W.*
- 1860 Leader, Nicholas P., Esq., M.P. *Conservative Club, S.W.*; and *Dromagh, Cork.*
- 1861 930 *Learmouth, Dr. John. *Ryde, Isle of Wight.*
- 1853 *Le Breton, Francis, Esq. 21, *Sussex-place, Regent's-park, N.W.*
- 1861 Leckie, Patrick C., Esq. 7, *Palace-road, Roupell-park, Streatham; S.*
- 1857 Lee, George, Esq. *Frogmore, Roke, Guernsey.*
- 1830 *Lee, John, Esq., LL.D., D.C.L., Pres. of the R. Astr. Soc., F.R.S., F.S.A., F.R.S.N.A., &c. 5, *College, Doctors'-commons E.C.*; and *Hartwell-house, near Aylesbury, Bucks.*
- 1839 Lee, Thomas, Esq. *Great Barr, Staffordshire.*
- 1861 Lefevre, George Shaw, Esq. 8, *Spring-gardens, S.W.*
- 1833 *Lefevre, Sir John George Shaw, M.A., D.C.L., F.R.S., Vice-Chancellor of the University of London. 8, *Spring-gardens, S.W.*
- 1853 Lefroy, Colonel John Henry, R.A., F.R.S. *Royal Arsenal, Woolwich, S.E.*
- 1862 Leggatt, Clements Davidson, Esq. *Bombay.*
- 1861 940 Legh, Wm. John, Esq., M.P. 37, *Lowndes-square, S.W.*; and *Lyme-park, Cheshire.*
- 1861 *Lehmann, Frederick, Esq. 139, *Westbourne-terrace, W.*
- 1845 Leigh, John Studdy, Esq. 54, *Leinster-square, Kensington-gardens, W.*
- 1836 Lemon, Sir Charles, Bart., F.R.S., &c. *Carclew, near Falmouth, Cornwall.*
- 1857 *Lenox, George Wm., Esq. 34, *Portland-place, W.*; and *Pont-y-Pridd, Glamorganshire.*
- 1859 Leslie, Patrick, Esq. *Emmerden-house, Upper Norwood, S.*
- 1859 Leslie, Walter D., Esq. *Arthur's Club, St. James's-street, S.W.*
- 1862 Leslie, Wm., Esq., M.P. *Warthill, Aberdeenshire*; and *Carlton Club, S.W.*
- 1840 *Letts, Thomas, Esq. 8, *Royal Exchange, E.C.*
- 1857 Leveson, George B. C., Esq. 19, *Bloomsbury-square, W.C.*
- 1862 950 Levick, Joseph, Esq. 21, *Cleveland-gardens, W.*
- 1859 Levinsohn, Louis, Esq. 7, *Finbury-square, E.C.*
- 1859 Lewis, Rev. Evan, R.A. *Rothwell, Northamptonshire.*
- 1852 Leycester, Commander Edmund M., R.N., Superintendent of Packets and Transports. *Admiralty-office, Liverpool.*
- 1861 Leyland, Luke Swallow, Esq. 7, *Walton-place, Brompton, S.W.*
- 1857 Liardet, Capt. Francis, R.N. *Royal Hospital, Greenwich, S.E.*
- 1859 Lichfield, Thomas George, Earl of. *Shugborough, Staffordshire.*
- 1856 Lilford, Thomas Lyttleton Powys, Lord. 10, *Grosvenor-place, W.*
- 1860 Lindsay, H. Hamilton, Esq. 22, *Berkeley-square, W.*
- 1857 Lindsay, Maj.-Gen. the Hon. J., Gren. Guards, M.P. 20, *Portman-square, W.*

Year of
Election

- 1861 960 Lindsay, W. Lauder, Esq., M.D., F.R.S. Edin. *Pitcullen-house, Perth, N.B.*
- 1855 *Lindsay, Wm. S., Esq., M.P. *Manor-house, Shepperton, Middlesex.*
- 1858 Lister, John, Esq., M.D. 6, *Porchester-terrace, Hyde-park, W.*
- 1861 Lloyd, Alexander Ogilvie, Esq. 3, *Hare-court, Temple, E.C.*
- 1857 *Lloyd, George A., Esq. 2, *Royal Exchange-buildings, E.C.*
- 1861 Lluellyn, Capt. Richard. 20, *Montagu-square, W.C.*
- 1859 Loch, Henry Brougham, Esq. 11, *Brook-street, W.*
- 1861 Loch, John Charles, Esq. 12, *Albemarle-street, W.; and Hong-Kong.*
- 1857 Loch, William Adam, Esq. 8, *Great George-street, Westminster, S.W.*
- 1858 Lockhart, William, Esq., F.R.C.S. *Park-villas, Grangeville-park, Blackheath, S.E.; and China.*
- 1860 970 Lockwood, James Alfred. *Huddersfield.*
- 1856 *Logan, Sir William Edmond, F.R.S. *Montreal, Canada.*
- 1855 Login, Sir John Spencer. 5, *The Square, Upper Hyde-park-gardens, W.*
- 1860 Loadesborough, Wm. Henry Forester, Lord. *Thomas's Hotel, 25, Berkeley-sq., W.*
- 1830 Long, George, Esq., M.A. 22, *Buckingham-street, Brighton.*
- 1839 *Long, Henry L., Esq. *Travellers' Club, S.W.; and Hampton-lodge, Farnham, Surrey.*
- 1857 *Long, W. Beeston, Esq.
- 1853 Longden, Morrell D., Esq. 4, *Ennismore-place, Hyde-park, S.W.*
- 1861 Longford, Edward Michael Pakenham, Earl of. 24, *Bruton Street, Berkeley-square, W.; and Pakenham-hall, Westminster.*
- 1847 Longman, Thos., Esq. *Paternoster-rose, E.C.; and 8, Sussex-sq., Hyde-park, W.*
- 1858 980 Longman, William, Esq. 36, *Hyde-park-square, W.*
- 1861 Lonsdale, Arthur Pemberton, Esq. 15, *Cockspur-street, S.W.*
- 1860 Looker, William Robert, Esq. 8, *Park-villas, West Richmond, S.W.*
- 1861 Lorimer, George, Esq. *Westminster Club, Albemarle-street, W.*
- 1856 Lovett, Phillips Cosby, Esq. *Liscombe-ho., Liscombe, Leighton Buzzard, Bucks.*
- 1861 Low, Robert, Esq. 17, *Woburn-square, W.C.*
- 1858 Lowden, Rev. George Rouse. 12, *Leinster-gdns., Hyde-park, W.; and Uxbridge.*
- 1859 Lowe, Capt. W. Drury. *Myria, Bettws-y-Coed, Llanrwst, North Wales.*
- 1830 Lowry, Joseph Wilson, Esq. 45, *Robert-street, Hampstead-road, N.W.*
- 1860 Luke, William, Esq., Bengal Civil Service. 93, *Inverness-terr., Hyde-park, W.*
- 1862 990 Lumsden, James Grant, Esq. *Grey-lodge, Torquay.*
- 1860 Lumsden, Rev. Robert Cornyn. *Broomhall-park, Sheffield.*
- 1860 Lush, Robert, Esq., Q.C. *Balmoral-house, Avenue-road, Regent's-park, N.W.*
- 1830 *Lyell, Sir Charles, M.A., LL.D., F.R.S. 53, *Harley-street, Cavendish-square, W.*
- 1837 *Lynch, Capt. H. Blosse, I.N., C.B., F.R.A.S. *Athenæum Club, S.W.*
- 1861 *Lynch, Thomas Kerr, Esq. 99, *Gloucester-terrace, Hyde-park, W.*
- 1858 Lyne, Francis, Esq.
- 1862 Lyon, David, Esq. 31, *South-street, Park-lane, W.*
- 1862 *Macarthur, Major-Gen. Edward, C.B. 133, *Piccadilly, W.*
- 1860 McClintock, Capt. Sir Francis Leopold, R.N.
- 1862 1000 McCosh, John, Esq., M.D. 17, *Halfmoon-street, Piccadilly, W.*

Year of
Election.

- 1862 Macdonald, Chessborough C., Esq. 13, *Upper Wimpole-street, W.*
- 1863 Macdonald, Duncan George Forbes, Esq., C.B. 18, *Parliament-street, S.W.*
- 1830 MacDonnell, John, Esq. 48, *Grove-end-road, St. John's-wood, N.W.*
- 1863 Macfarlan, George, Esq. 33, *North Audley-street, W.*
- 1858 MacDougall, Alex. H., Esq. 44, *Parliament-street, Westminster, S.W.*
- 1862 M'Dougall, Geo. Fred., R.N. *Admiralty Survey, Oban, N.B.*
- 1861 MacGeorge, Colonel, Bengal Army. 18, *Cleveland-square, W.*
- 1859 McGrath, John C., Esq. *Reform Club, S.W.*
- 1856 Macgregor, Alexander, Esq. *West India Committee Rooms, 37, Walbrook, E.C.*
- 1855 1010 McGregor, Duncan, Esq. *Board of Trade, S.W.; and Athenæum Club, S.W.*
- 1839 Macintosh, Lieut.-General Alex. Fisher, K.H. 7, *Tilney-street, Park-lane, W.*
- 1845 *Macintyre, Patrick, Esq., F.S.A., Off. Assoc. Inst. Act. 1, *Greville-place, Kilburn-priory, W.*
- 1859 Mackay, Rev. Alexander, A.M. *Rhynie, Aberdeenshire.*
- 1860 Mackay, Thomas Miller, Esq. 24, *Leinster-gardens, Baywater, W.*
- 1859 *Mackean, Thos. W. L., Esq. 24, *Oxford-square, Hyde-park, W.*
- 1862 Mackenzie, Colin J., Esq. *Windham Club, S.W.*
- 1845 Mackenzie, Right Hon. Holt, F.R.S. *Athenæum Club, S.W.; and 28, Wimpole-street, W.*
- 1861 Mackenzie, Sir James J. Randall, Bart., of *Seatwell, Roschaugh, Munlochy, N.B.*
- 1860 *Mackenzie, James T., Esq. 69, *Lombard-street, E.C.*
- 1858 1020 McKerrell, Robert, Esq. 45, *Inverness-terrace, W.; and Mauritius.*
- 1830 Mackillop, James, Esq., F.R.S. 30, *Grosvenor-square, W.*
- 1861 Mackinnon, Lachlan, Esq. *Reform Club, S.W.; and Bittacy-house, Mill-hill, N.W.*
- 1855 Mackinnon, Wm. Alex., Esq., M.P., F.R.S. 4, *Hyde-park-place, W.*
- 1861 Mackintosh, Alexander Brodie, Esq. *Oriental Club, W.; and Dumoon, Scotland.*
- 1860 Mackirdy, Lt.-Col. Elliot, 69th Bgt. *U.S. Club, S.W.; and Tonghoo, Birmah.*
- 1860 Maclean, William Crichton, Esq. 5, *Camperdown-terrace, Great Farnmouth.*
- 1859 Maclear, Sir Thomas. *Astronomer Royal, Cape of Good Hope.*
- 1859 MacLeay, George, Esq. *Athenæum Club, S.W.; and Sydney.*
- 1852 M'Leod, J. Lyons, Esq., late Consul for Mozambique.
- 1852 1030 M'Leod, Walter, Esq. *Head Master of the Royal Military Asylum, Chelsea, S.W.*
- 1855 Maclure, Andrew, Esq. 37, *Walbrook, E.C.*
- 1861 Maclure, John William, Esq. 2, *Bond-street, Manchester.*
- 1855 *M'Clure, Captain Sir Robert J. Le M., R.N. *H.M.S. 'Esq.'*
- 1860 Macmillan, Alex., Esq. *Cambridge; and 23, Henrietta-st., Covent-garden, W.C.*
- 1855 Macnab, John, Esq. *Stead's-place, Leith-walk, Edinburgh.*
- 1839 M'Neil, The Right Hon. Sir John, G.C.B. *Granton, near Edinburgh.*
- 1861 *McConnell, W. R., Esq., Barrister-at-Law. 35, *Belford-pl., Russell-sq., W.C.; and Charleville, Belfast.*
- 1856 *Macpherson, Duncan, Esq., M.D., Inspector-General of Hospitals.
- 1861 Macpherson, William, Esq. 6, *Stanhope-street, Hyde-park-gardens, W.*
- 1845 1040 Macqueen, James, Esq. 4, *Alma-terrace, Hammer-smith, W.*
- 1861 *Maguire, Capt. Rochfort, R.N. *United Service Club, S.W.*

Year of
Election.

- 1853 Majendie, Ashhurst, Esq., F.R.S. *Athenæum Club, S.W.*; 152, *Albany-street, Regent's-park, N.W.*; and *Heddingham-castle, Essex.*
- 1845 *Major, Richard Henry, Esq. *British Museum, W.C.*
- 1858 Malby, John Walter, Esq. 8, *Swinton-street, Gray's-inn-road, W.C.*
- 1853 *Malby, Thomas, Esq. 2, *Park-villas, Seven-sisters'-road, Holloway, N.*
- 1862 *Malcolm, Capt. Edward Donald, R.E. *Aldershot.*
- 1843 *Malcolm, W. E., Esq. *Burnfoot, Langholme, near Carlisle.*
- 1853 *Mallet, Charles, Esq. *Audit Office, W.C.*; and *Belmont, Hampstead, N.W.*
- 1836 *Manchester, James Prince Lee, Bishop of, F.R.S., &c. *Athenæum Club, S.W.*; and *Sedgley-hall, Manchester.*
- 1830 1050 *Mangles, Capt. James, R.N., F.R.S. *Fairfield, near Exeter.*
- 1860 Mann, James Alexander, Esq., M.R.S.A. *Kensington-palace, W.*
- 1856 Manning, Frederick, Esq. *Byron-lodge, Leamington.*
- 1859 Mantell, Wm. Walter, Esq.
- 1859 Marett, Charles, Esq., M.A., Barrister-at-Law. 56, *Chancery-lane, W.C.*
- 1860 Mariette, Prof. Alphonse, M.A. 33, *Blandford-square, W.*
- 1830 *Marjoribanks, Edward, Esq. 34, *Wimpole-street, W.*
- 1854 Markham, Clements Robert, Esq. *India Office, S.W.*
- 1836 *Markham, Edward, Esq. 45, *Welbeck-street, Cavendish-square, W.*
- 1857 Marlborough, George, Duke of. *Blenheim, Woodstock.*
- 1857 1060 *Marsden, Robert C., Esq. 14, *Hanover-terrace, Regent's-park, N.W.*
- 1857 Marsh, Matthew Henry, Esq., M.P. *Oxford and Cambridge Club, S.W.*; and 41, *Rutland-gate, S.W.*
- 1862 Marshall, Capt. J. G. Don. *College-green, Gloucester.*
- 1854 Marshall, Jas. Garth, Esq. *Headingley, nr. Leeds*; and *Monk Coniston, Ambleside.*
- 1862 Marshall, William, Esq. *Oxford and Cambridge Club, S.W.*
- 1859 *Marsham, the Hon. Robert. *The Mote, Maidstone, Kent*; and *Japan.*
- 1857 Marshman, J. C., Esq. 7, *Kensington-palace-gardens, W.*
- 1857 Martin, Francis P. B., Esq.
- 1861 Martin, Henry, Esq. *Adelaide, Victoria, Australia.*
- 1860 *Martin, Richard Biddulph, Esq. 21, *Eaton-square, S.W.*
- 1862 1070 Martin, Thomas, Esq. 22, *Stock Orchard-villas, Caledonian-rd., Holloway, N.*
- 1830 *Martineau, Joseph, Esq., F.R.S., F.R.S. *Athenæum Club, S.W.*; *Basing-park, Alton, Hunts*; and *Whitbread's-brewery, E.C.*
- 1845 *Matheson, Sir James, Bart., M.P., F.R.S. 13, *Cleveland-row, S.W.*; and *Achny, Bonar-bridge, Sutherlandshire, &c.*
- 1858 Mathieson, James Ewing, Esq. 77, *Lombard-street, E.C.*; and 16, *Queen's-gardens, Baywater, W.*
- 1837 *Maughan, Captain P., Indian Navy, F.R.A.S. 37, *McNeill-street, Edinburgh.*
- 1855 May, Daniel John, Esq., R.N. *Cape of Good Hope.*
- 1858 Mayer, Joseph, Esq., F.R.S. 68, *Lord-street, Liverpool.*
- 1861 Mayers, William S. F., Esq., Interpreter to H.M. Consulate; *Canton.*
- 1862 Mayne, Commr. Richard Charles, R.N. *H.M.S. 'Eclipse'*; and 80, *Chester-square, S.W.*

Year of
Election.

- 1858 Mayo, Capt. John Pole. *Army and Navy Club, S.W.*
- 1863 1080 Meade, the Hon. Robert Henry. *Foreign Office, S.W.; and 3, Belgrave-square, S.W.*
- 1862 *Medlycott, Lieut. Mervyn B., R.N. *H.M.S. 'Britannia.'*
- 1860 *Meinertzhagen, Daniel, Esq. 10, *Moorgate-street, E.C.; and 28, Devonshire-place, Portland-place, W.*
- 1854 Melvill, Col. Sir Peter Melvill, Mil. Sec. to the Bombay Gov. 27, *Palmeira-square, Brighton.*
- 1838 Melvill, Philip, Esq., F.R.A.S. *Ethy House, Lostwithiel, Cornwall.*
- 1842 *Merivale, Herman, Esq., Under Sec. of State for India. *India Office, Victoria-street, Westminster, S.W.; and 26, Westbourne-terrace, W.*
- 1860 Michell, Thomas, Esq. *St. Petersburg.*
- 1848 Middleton, Capt. Sir G. N. Broke, Bart., R.N. *H.M.S. 'Hero,' Sheerness; and Broke-hall, Suffolk.*
- 1859 Miland, John, Esq. 4, *Mount-street, Berkeley-square, W.*
- 1861 Miles, Pliny, Esq. 43, *Great Tower-street, E.C.*
- 1860 1090 Miles, Rev. R. *Bingham, Notts.*
- 1861 Miller, George T. *The Elms, Upper Tooting, Surrey.*
- 1861 *Miller, Lieut. Henry Matthew, R.N. *The Grove, Exeter; and Junior United Service Club, S.W.*
- 1853 *Miller, Captain Thomas, R.N. *H.M.S. 'Clio;' and United Service Club, S.W.*
- 1861 Milligan, Joseph, Esq. *Athenaeum Club, S.W.; and 15, Northumberland-street, W.C.*
- 1857 Mills, Arthur, Esq., M.P. 34, *Hyde-park-gardens, W.*
- 1860 Milman, Capt. Everard, Madras Horse Artillery. 9, *Berkeley-square, W.*
- 1853 Milnes, Richard Monckton, Esq., M.P. 16, *Upper Brook-street, W.; The Hall, Bawtry; and Fryston-hall, Ferribridge, Yorkshire.*
- 1860 Mitchell, Alexander, Esq. 6, *Great Stanhope-street, Park-lane, W.*
- 1862 *Mitchell, George, Esq. 22, *Bolton-street, Piccadilly, W.*
- 1859 1100 Mitchell, William, Esq. 54, *Gracechurch-street, E.C.; and 6, Hyde-park-gate, Kensington-gore, W.*
- 1851 *Mocatta, Frederick D., Esq. 35, *Gloucester-place, Portman-square, W.*
- 1858 Moffat, Robert, Esq. *Gov. Surveyor, Hope Town and Kuruman, Cape of Good Hope.*
- 1853 Moffatt, George, Esq., M.P. 103, *Eaton-square, S.W.*
- 1861 Mollison, Alexander Fullerton, Esq. 10, *Landoune-terrace, Notting-hill, W.*
- 1860 *Molson, Thomas, Esq. 1, *Molson-terrace, Montreal, Canada.*
- 1861 Money, Lieut.-Col. George Henry. 9, *Berkeley-street, W.*
- 1862 *Montague, Capt. Horace. 21, *Marlborough-place, St. John's-wood, N.W.*
- 1842 *Montagu, Major Willoughby. *Clapham-common, S.*
- 1842 *Monteagle, Thomas, Lord, F.R.S. 7, *Park-street, Westminster, S.W.; and Mount Trenchard, Limerick.*
- 1830 1110 *Montefiore, Sir Moses, Bart., F.R.S., F.R.S.N.A. 7, *Grosvenor-gate, Park-lane W.; and East-cliff-lodge, Ramsgate.*
- 1830 *Monteith, Lieut.-General William, E.I.C. Eng., F.R.S. 11, *Upper Wimpole-street, W.; and Oriental Club, W.*

Year of Election.	
1859	Montgomerie, F. Butler, Esq. 2, <i>Cleveland-row, St. James's, S.W.</i> ; and <i>St. Leonard's-on-Sea</i> .
1859	Montgomerie, Capt. T. G., Beng. Engrs., 1st Assist. Trig. Survey. <i>Dehra Dun</i> .
1860	Montgomery, Robert Martin, Esq. 6, <i>Ashley-place, Victoria-street, S.W.</i>
1839	Moody, Lieut.-Colonel R. C., R.E. <i>British Columbia</i> ; and <i>Junior United Service Club, S.W.</i>
1861	Moon, Rev. Edward Graham. <i>Fetcham, Surrey</i> .
1859	Moon, William, Esq. 104, <i>Queen's-road, Brighton</i> .
1857	*Moor, Rev. Allen P., M.A., F.R.S. Sub-Warden <i>St. Augustine College, Canterbury</i> .
1857	Moore, Captain John, R.N., C.B. <i>Admiralty, S.W.</i>
1862	1120* Moore, John Bramley, Esq., M.P. <i>Aigburth, near Liverpool</i> .
1861	Moore, John Carrick, Esq. <i>Cornwall, Wigtownshire</i> ; and 23, <i>Bolton-street, W.</i>
1857	Moore, Major-General W. Y. <i>United Service Club, S.W.</i>
1861	Morgan, Junius Spencer, Esq. 13, <i>Prince's-gate, Hyde-park, W.</i>
1861	Morgan, William, Esq., R.N. <i>H.M.S. 'Pembroke,' Harwich</i> .
1839	*Morris, Charles, Esq. <i>University Club, S.W.</i>
1861	Morrison, Captain Peter. 3, <i>Pall-mall, S.W.</i> ; and <i>Porchester-square, W.</i>
1861	Mouat, Frederick J., Esq., M.D., Surgeon-Major and Inspector-General of Prisons, <i>Bengal Army, &c. Athenæum Club, S.W.</i> ; and <i>India</i> .
1858	Mudie, Charles Edward, Esq. <i>The Green, Hampstead, N.W.</i>
1858	Mueller, Ferdinand, Esq., M.D., PH. DR. <i>Director of the Botanical Gardens, Melbourne</i> .
1862	1130 Muir, Francis, Esq. 13, <i>Queen-street, Glasgow</i> .
1855	Muir, Thomas, Esq. 24, <i>Fork-terrace, Regent's-park, N.W.</i>
1859	Murchison, Kenneth R., Esq. <i>Manor-house, Bathford, Bath</i> .
1830	*Murchison, Sir Roderick Impey, K.C.B., G.C.S.T.S., M.A., D.C.L., V.P.R.S., G.S., and L.S., Director-General of the Geological Survey of Great Britain and Ireland, Trust. Brit. Mus., Hon. Mem. R.S. of Ed., R.I.A., Mem. Acad. St. Petersburg, Berlin, Stockholm, Brussels, and Copenhagen, Corr. Ins. Fr., etc. etc. 16, <i>Belgrave-square, S.W.</i> ; and 28, <i>Jermyn-street, S.W.</i>
1830	*Murdoch, Thomas W. C., Esq. 8, <i>Park-street, Westminster, S.W.</i> ; and <i>River-bank, Putney, S.W.</i>
1860	Murray, George J., Esq. <i>Shrivenham House, Shrivenham, Berks</i> .
1851	*Murray, Rear-Adm. the Hon. Henry Anthony. 4D, <i>Albany-chambers, W.</i>
1844	*Murray, James, Esq. <i>Foreign Office, S.W.</i>
1830	Murray, John, Esq. 50, <i>Albemarle-street, W.</i> ; and <i>Newstead, Wimbledon, S.W.</i>
1860	*Murray, Lt. W., 68th Beng. N. Inf., Topo. Assist. G. Trig. Survey. <i>Mussoorie, India</i> .
1853	1140 Napier, Col. Geo. Thomas Conolly, C.B., Assist. Adj.-Gen. <i>Junior U.S. Club, S.W.</i>
1861	Napier, William, Esq. 1, <i>Blessington-road, Lee, Blackheath, S.E.</i>
1857	Napier, Hon. William. 54, <i>Green-street, Grosvenor-square, W.</i>
1857	Nares, Francis, Esq. <i>Athenæum Club, S.W.</i>
1859	*Nasmyth, Capt. David J., 1st Assist. Trigonometrical Survey. <i>East India U.S. Club, S.W.</i> ; 5, <i>Charlotte-square, Edinburgh</i> ; and <i>Bhoof, Bombay</i> .

Year of
Election.

- 1861 Neave, Sir Richard Digby, Bart. *Travellers' Club, S.W.*; 78, *Eccleston-square, S.W.*; and *Dagnam-park, Romford, Essex.*
- 1857 Nelthropp, George, Esq. 20, *Gloucester-street, Belgrave-road, S.W.*
- 1857 *Nesbitt, Henry, Esq. 19, *Pembury-road, Lower Clapton, N.E.*
- 1859 *Newcastle, Henry Pelham-Clinton, Duke of. *Colonial Office, S.W.*; *Clumber-park, Worksop-manoir*; and *Nottingham-castle, Notts.*
- 1856 Newman, Thomas Holdsworth, Esq. 14, *Arlington-street, S.W.*
- 1856 1150 Nicholson, Sir Charles, Bart., D.C.L., Chancellor of the University, Sydney. 5, *Cleveland-rove, St. James's-palace, S.W.*
- 1861 Nicholson, Lt.-Col. Lothians, R.E. 26, *Suffolk-street, Pall-mall, S.W.*; and 11, *James-street, Buckingham-gate, S.W.*
- 1844 Nicolay, Rev. Chas. Grenfell. *Bahia.*
- 1836 Nicolson, Capt. Sir Frederick Wm. Erskine, Bt., R.N. *Woolwich Dockyard, S.E.*
- 1858 Nix, John H., Esq. 77, *Lombard-street, E.C.*
- 1860 Nixon, Brinsley de Courcy, Esq. *Athenaeum Club, S.W.*
- 1861 Noel, the Hon. Roden. 11, *Chandos-street, Cavendish-square, W.*; and *Exton-hall, Oakham, Rutlandshire.*
- 1857 *Nolloth, Captain Matthew S., R.N. *Hong-Kong*; *United Service Club, S.W.*; and *Peckham, Surrey, S.E.*
- 1860 Norris, Harvy, Esq. *Colonial Office, S.W.*; and 4, *Little St. James-street, S.W.*
- 1861 North, Alfred, Esq. *Salcombe-hill-house, Sidmouth.*
- 1856 1160 North, Frederic, Esq., M.P. 3, *Victoria-street, Westminster, S.W.*; and *Hastings-lodge, Hastings.*
- 1830 *Northumberland, Algernon, Duke of, Vice-Admiral, K.G., F.R.S., F.S.A., F.R.S.N.A., Pres. R.I. *Northumberland-house, Charing-cross, S.W.*; *Alnwick and Keilden Castles, Northumberland*; *Werrington-park, Cornwall*; *Sion-house, Middlesex, W.*; and *Stanwick-park, Yorkshire.*
- 1862 Notman, Henry Wilkes, Esq. 7, *Great Marlborough-street, W.*
- 1862 Notman, Robert Russell, Esq. 7, *Great Marlborough-street, W.*
- 1862 Nourse, Henry, Esq. *Conservative Club, S.W.*
- 1858 *Oakeley, R. Banner, Esq. *Oncaldkirk-hall, Yorkshire.*
- 1859 Oakley, Rev. Charles E., M.A.
- 1856 O'Connor, Col. Luke Smyth, C.B., late Governor of the Gambia. *U.S. Club, S.W.*
- 1858 Ogilvie, Edward D., Esq. *Fulgillar, Clarence river, New South Wales.*
- 1859 Ogle, John W., Esq., M.D. 13, *Upper Brook-street, W.*
- 1861 1170 Oldershaw, Capt. Robert Piggott. 74, *Warwick-square, Belgrave-road, S.W.*
- 1863 Olding, J. A., Esq. 10, *Lee-road, Blackheath, S.E.*
- 1861 Oliphant-Ferguson, G. H., Esq. *Broadfield-house, Carlisle.*
- 1855 Oliphant, Laurence, Esq. *Athenaeum Club, S.W.*; and 4, *Mount-street, W.*
- 1853 Oliveira, Benjamin, Esq., F.R.S. 8, *Upper Hyde-park-street, W.*
- 1845 *Ommanney, Capt. Erasmus, R.N., F.R.A.S. *United Service Club, S.W.*, and *Gibraltar.*
- 1838 *Ommanney, H. M., Esq. *Blackheath, S.E.*

1 *List of Fellows of the*

Year of Election.	
1853	Osborn, Sir George R., Bart. <i>Travellers' Club, S.W.; and Chicksand-priory, Beds.</i>
1856	Osborn, Capt. Sherard, R.N., C.B., Officier de Légion d'Honneur, etc. <i>Junior United Service Club, S.W.; and 8, Southwick-street, Oxford-square, W.</i>
1861	Osborn, Capt. Willoughby. <i>India.</i>
1852	1180 Oswell, William Cotton, Esq.
1860	Otter, Charles, Esq. 13, <i>Leinster-gardens, Hyde-park, W.</i>
1853	Otway, Arthur John, Esq. <i>Army and Navy Club, S.W.</i>
1860	*Ouvry-North, the Rev. J. <i>East Acton, Middlesex, W.</i>
1844	*Overstone, Samuel, Lord, M.A., M.B.I. 2, <i>Carlton-gardens, S.W.; and Wickham-park, Surrey.</i>
1854	Oxenham, Rev. William, M.A. <i>Harrow, Middlesex, N.W.</i>
1846	*Oxford, Rt. Rev. Samuel Wilberforce, Bishop of, F.R.S., F.S.A. 26, <i>Pall-mall, S.W.; Cuddesden-palace, Wheatley, Oxfordshire; and Lavington, Sussex.</i>
1852	Packman, Fred. W. S., Esq., M.D. 12, <i>Charges-street, Piccadilly, W.; and Cupton-hall, Chesterfield, Derbyshire.</i>
1861	Page, Thomas, Esq., C.E., F.R.S. 2, <i>Middle Scotland-yard, S.W.; and Toner Cressy, Aubrey-road, Bayswater, W.</i>
1860	Paget, Arthur, Esq. <i>Cranmore-hall, Shepton Mallet, Somersetshire.</i>
1853	1190 Pakington, Right Hon. Sir John Somerset, Bart., M.P. 41, <i>Eaton-square, S.W.; and Westwood-park, Droitwich, Worcestershire.</i>
1856	Palliser, Captain John. <i>Comrah, Kilmackthomas, Waterford; and National Club, Whitehall-gardens, S.W.</i>
1855	Palmer, Major Edm., R.A. 7, <i>Home-park, Stoke, Deconport.</i>
1862	Palmer, Rev. Jordan, M.A., F.S.A., Chaplain to St. Ann's Royal Society. <i>Streatham, S.</i>
1838	*Palmer, Samuel, Esq.
1851	Palmerston, Henry John, Lord Viscount, M.P., K.G., G.C.B., F.R.S., &c. <i>Cambridge-house, Piccadilly, W.; and Broadlands, Romsey, Hants.</i>
1849	*Parish, Commr. John E., R.N. <i>H.M.S. 'Ardent'; and Army and Navy Club, S.W.</i>
1833	*Parish, Sir Woodbine, K.C.H., F.R.S., &c. <i>Quarry-house, St. Leonard's-on-Sea.</i>
1862	Park, Lt.-Colonel A., H.M. Indian Army. 41, <i>Porchester-square, W.</i>
1862	Parker, Henry T., Esq. 3, <i>Ladbroke-gardens, Kensington-park, W.</i>
1862	1200 Parker, Robert Deane, Esq. <i>Union Club, S.W.; and Barham, Canterbury.</i>
1850	Parkes, Sir Harry S., C.B., &c. <i>Oriental Club, W.; and Oakhill, Hampstead.</i>
1850	*Parkyns, Mansfield, Esq., F.R.S. <i>Arthur's Club, St. James's-street, S.W.; and Woodborough-hall, Southwell.</i>
1854	Parr, Thomas Clements, Esq., M.A. 21, <i>West-mall, Clifton.</i>
1859	Pasteur, Marc Henry, Esq. 58, <i>Mincing-lane, E.C.</i>
1857	Paton, Andrew A., Esq. <i>H.B.M.'s V.-Consul, Missolonghi, Greece; 20, Bread-street, E.C.</i>
1858	Paul, Joseph, Esq. <i>Ormecade-house, Ryde, I. of Wight.</i>
1862	Pauli, Charles P., Esq. <i>Kirby-hall, Horton, Kirby.</i>

Year of
Election.

- 1847 *Paynter, William, Esq., F.R.A.S. 21, *Belgrave-square, S.W.*; and *Camborne-house, Richmond, Surrey, S.W.*
- 1855 Peabody, George, Esq. 22, *Old Broad-street, E.C.*
- 1853 1210 Peacock, George, Esq. *Starcross, near Exeter.*
- 1860 Pearce, Ebenezer John, Esq., PH. DR., Principal of *Great Ealing School, Ealing, Middlesex, W.*
- 1853 *Peckover, Alexander, Esq. *Wisbeach.*
- 1860 *Peek, Henry William, Esq. *Wimbledon-house, S.W.*
- 1861 Peel, Archibald, Esq. 56, *Portland-place, W.*
- 1858 Peel, Sir Robert, Bart., M.P. 4, *Whitehall-gardens, S.W.*; and *Drayton-manoor, Tamworth.*
- 1846 *Pelly, Sir John Henry, Bart. *Upton, Essex.*
- 1859 *Pennant, George Sholto Douglas, Esq. *Penrhyn-castle, Bangor.*
- 1830 *Penn, Richard, Esq., F.R.S. 6, *Lancaster-place, Richmond, S.W.*
- 1853 Percy, Colonel the Hon. Hugh M. (Guards). 11, *Portman-square, W.*
- 1860 1220 Perkins, Frederick, Esq. *Mayor of Southampton.*
- 1860 Perowne, Rev. J. J. Stewart. *Divinity and Hebrew Lecturer, St. David's College, Lampeter, S. Wales.*
- 1859 Perry, Sir Erskine, Member Indian Council. 36, *Eaton-place, S.W.*
- 1859 Perry, William, Esq., H.B.M.'s Consul, Panama. *Athenaeum Club, S.W.*
- 1862 *Perry, William, Esq. 9, *Warwick-road, Upper Clapton, N.E.*
- 1862 Peter, John, Esq. 33, *Prince's-gate, Hyde-park, W.*
- 1857 *Peters, William, Esq. 35, *Nicholas-lane, Lombard-street, E.C.*
- 1860 Petherick, John, Esq., H.B.M.'s Consul for the Sudan.
- 1858 Peto, Sir S. Morton, Bart., M.P. 12, *Kensington-palace-gardens, W.*
- 1861 Petrie, Alexander S., Esq. 4, *St. Mark's-square, E.C.*
- 1860 1230 Petrie, Captain Martin, 14th Regiment. 4, *New-street, Spring-gardens, S.W.*
- 1862 Peyton, Col. John L. *Staunton, Virginia*; and 71, *Jermyn-street, S.W.*
- 1854 Phelps, William, Esq. 18, *Montagu-place, Russell-square, W.C.*
- 1862 Phené, John Samuel, Esq. 34, *Oakley-street, Chelsea, S.W.*
- 1857 Phillimore, Capt. Augustus, R.N. *Shiplake-house, Reading*; and *U. S. Club, S.W.*
- 1859 Phillimore, Chas. Bagot, Esq. *India Office, S.W.*; and 25, *Upper Berkeley-st., W.*
- 1843 Phillimore, John George, Esq., Q.C. 19, *Old-buildings, Lincoln's-inn, W.C.*
- 1860 Phillimore, Wm. Brough, Esq., late Capt. Grenadier Guards. 5, *John-street, Berkeley-square, W.*
- 1860 Phillip, George, Esq. 32, *Fleet-street, E.C.*
- 1830 *Phillips, Sir Thomas, Bart., M.A., F.R.S., F.S.A. *Athenaeum Club, S.W.*; and *Middle-hill, Broadway, Worcestershire.*
- 1854 1240 Phillips, Major-General Sir B. Travell. *United Service Club, S.W.*
- 1856 Phillips, John, Esq., Solicitor. *Hastings.*
- 1859 Phinn, Thomas, Esq., Q.C. 50, *Pall-mall, S.W.*
- 1861 Pike, Frederick, Esq. 44, *Charing-cross, S.W.*
- 1852 *Pike, Commander John W., R.N. 26, *Old Burlington-street, W.*; *Junior United Service Club, S.W.*

Year of Election.

- 1855 Pilkington, James, Esq., M.P. *Reform Club, S.W.; and Blackburn.*
- 1851 *Pim, Commander Bedford C.T., R.N. *Junior United Service Club, S.W.; and Tuthwell-house, Belsize-park, N.W.*
- 1858 Pincott, James, Esq. *University College, London, W.C.; and Christchurch-road, Roupell-park, Brixton-hill, S.*
- 1859 Pinney, Colonel William, M.P. 30, *Berkeley-square, W.*
- 1858 Platen, His Excellency Count.
- 1860 1150 Playfair, Capt. Robert Lambert, Madras Artillery. *Acting Political Agent, Aden.*
- 1860 Plowden, Charles Hood C., Esq. 15, *York-street, Portman-square, W.*
- 1856 *Plowes, John Henry, Esq. 39, *York-terrace, Regent's-park, N.W.*
- 1834 *Pocock, John I., Esq. *Puckrup-hall, Tewkesbury.*
- 1862 Pollard, Commander Edwin John, R.N.
- 1855 *Pollexfen, Capt. J. J. *India.*
- 1837 *Pollington, John Charles George, Viscount, F.R.S. *Meshley-park, near Leeds.*
- 1853 Pollock, Lieut.-General Sir George, G.C.B. *Clapham-common, Surrey, S.*
- 1835 *Ponsonby, Hon. Frederick G. B. 3, *Mount-street, Grosvenor-square, W.*
- 1860 Pook, Captain John. 5, *Alpha-terrace, New-cross-road, S.E.*
- 1857 1160 Pope, Captain Wm. Agnew. 52, *Charles-street, Berkeley-square, W.*
- 1863 *Porcher, Commander Edwin A., R.N. 50, *Montagu-square, W.*
- 1853 Porter, Edw., Esq. *Athenaeum Club, S.W.; and 26, Suffolk-st., Pall-mall, S.W.*
- 1830 *Portlock, Maj.-General Joseph E., R.E., F.R.S. *Lota, Cross-avenue, Black-
rock, Dublin; and 58, Queen's-gardens, Hyde-park, W.*
- 1859 Pottinger, Lieut.-Colonel William. *Junior United Service Club, S.W.*
- 1861 *Pounden, Captain Lonsdale. *Junior United Service Club, S.W.; and Browns-
wood, Co. Wexford.*
- 1862 Povah, Rev. John V., M.A. 16, *Tavistock-square, W.C.*
- 1852 Powell, Lewis, Esq. *Port Lewis, Mauritius.*
- 1859 Power, E. Rawdon, Esq. 15, *Adam-street, Adelphi, W.C.*
- 1854 Power, John, Esq. 25, *Sussex-place, Regent's-park, N.W.; and Panama.*
- 1854 1170 Power, John Arthur, Esq., M.A., B.M. 52, *Burton-crescent, W.C.*
- 1860 Pratt, Hodgson, Esq.
- 1853 Price, Jas., Esq., M.D., F.R.C.S., &c. *Effra-road, Brixton, Surrey, S.*
- 1852 Price, James Glenis, Esq., Barrister-at-Law. 14, *Clemen's-ian, W.C.*
- 1859 Price, Capt. R. Havard, 31st Bengal N. Infantry. *Bengal.*
- 1860 *Prickett, Rev. Thomas William, M.A., F.S.A. *University Club, S.W.; and
Hull, Yorkshire.*
- 1855 *Pringle, Thomas Young, Esq. 14, *Eaton-square, S.W.*
- 1845 Prinsep, Henry T., Esq. *Little Holland-house, Kensington, W.*
- 1859 Pritchard, Wm. Thos., Esq. *H.B.M.'s Consul, Fiji.*
- 1861 *Prodgers, Rev. Edwin. *The Rectory, Ayott St. Peter's, Herts.*
- 1852 1180 Prout, John William, Esq., M.A., Barrister-at-Law. *Athenaeum Club, S.W.
and Newdon, Middlesex, N.W.*
- 1862 *Puget, Capt. J.

Year of
Election.

- 1860 Puller, Arthur Giles, Esq. *Athenæum Club, S.W.; and Youngsbury, Ware.*
- 1844 Puller, Christopher W. Giles, Esq., M.P. *Athenæum Club, S.W.; and Youngsbury, Ware, Herts.*
- 1857 Purcell, Edward, Esq., LL.D. 2, *Maze-hill, Greenwich, S.E.*
- 1859 Purdon, Wm. H., Esq., Executive Engineer, Punjab. 94, *Wimpole-street, W.*
- 1861 Quin, Lord George. 15, *Belgrave-square, S.W.*
- 1862 Quin, John Thos., Esq. *Metropolitan Training College, Highbury-park, North, N.*
- 1854 *Quin, Rear-Admiral Michael. *Senior U. S. Club, S.W.; and 18, Albion-villas, Albion-road, Islington, N.*
- 1858 *Radstock, Graville Augustus, Lord. 30, *Bryanston-square, W.*
- 1862 1290Rae, James, Esq. 10, *Gloucester-place, Hyde-park, W.*
- 1853 Rae, John, Esq., M.D. 4, *Fenchurch-street, E.C.; Canada; and 4, Belgrave-road, Eccleston-square, S.W.*
- 1859 Raikes, Henry, Esq., M.A. *Ilcynegrin-hall, Mold, Flintshire.*
- 1862 Ramsay, George D., Esq. *War Office, S.W.*
- 1851 *Ramsay, Rear-Admiral Wm., C.B., F.R.S. *Junior U. S. Club, S.W.; and 23, Ainslie-place, Edinburgh.*
- 1859 Ratcliff, Charles, Esq., F.S.A. *National Club, S.W.; Edgbaston, Birmingham; and Downing College, Cambridge.*
- 1861 Rate, Lachlan Macintosh, Esq. 9, *South Audley-street, W.*
- 1846 Ravenshaw, E. C., Esq., M.B.A.S. *Oriental Club, W.; and 5, Cavendish-square, W.*
- 1859 Ravenstein, Ernest G., Esq. *Topographical Dépôt, Spring-gardens, S.W.*
- 1861 Rawlinson, Sir Christopher. *United University Club, S.W.; and East Tollerley-park, Stockbridge, Hants.*
- 1844 1300*Rawlinson, Maj.-General Sir Henry C., K.C.B., D.C.L., F.R.S. *Athenæum Club, S.W.; and 1, Hill-street, Berkeley-square, W.*
- 1838 Rawson, Rawson Wm., Esq., C.B., Colonial Secretary. *Cape of Good Hope.*
- 1857 Reed, William, Esq. *Oak-lodge, Addison-road, Kensington, W.*
- 1861 *Reid, David, Esq. 57, *Jermyn-street, S.W.*
- 1858 Rees, L. E. R., Esq. *India.*
- 1859 Reeve, John, Esq. *Conservative Club, S.W.*
- 1856 Reid, Henry Stewart, Esq. *Bengal Civil Service.*
- 1857 Reid, Lestock R., Esq. *Athenæum Club, S.W.; and 122, Westbourne-ter., W.*
- 1861 Reid, William, Esq., C.E. 27, *Chalcot-villas, Haverstock-hill, N.W.*
- 1861 Reilly, Anthony Adams, Esq. *Belmont, Mullingar.*
- 1830 1310*Rennie, George, Esq., C.E., F.R.S., Hon. M.B.I.A. 39, *Wilton-crescent, Belgrave-square, S.W.; and Holmwood-lodge, near Dorking, Surrey.*
- 1830 *Rennie, Sir John, C.E., F.R.S., F.S.A. 5a, *Spring-gardens, S.W.*
- 1834 *Rennie, M. B., Esq., C.E. 39, *Wilton-crescent, Belgrave-square, S.W.*
- 1830 *Renouard, Rev. George Cecil, B.D., M.B.A.S. *Swanscombe-rectory, near Dartford.*
- 1830 *Renwick, Lieutenant, R.E.
- 1861 Reuter, Julius, Esq. 1, *Royal Exchange-buildings, E.C.*

Year of
Election.

- 1858 Reynardson, Henry Birch, Esq. *Adcell, near Tetworth, Oxfordshire.*
- 1861 Ricardo, David, Esq. *Gatcombe-park, Minchinhampton.*
- 1857 Richards, Capt. George H., R.N. *H.M.S. 'Plumper,' Pacific; and Torpoint, Cornwall.*
- 1860 Richards, the Rev. George, D.D. *Streatham, S.*
- 1830 1320*Richardson, Sir John, B.N., M.D., C.B., F.R.S. *Lancrigg, Grasmere, Westmoreland.*
- 1862 Richardson, Mark, Esq., late Beng. Med. Staff. *95, Inverness-terrace, W.*
- 1860 Richardson, Wm., Esq. *Reform Club, S.W.; and Hill-house, Hatfield.*
- 1859 Rickards, Edward Henry, Esq. *Drayton-house, West Drayton, Middlesex.*
- 1862 Riddell, Henry P. A. Buchanan, Esq. *Arthur's Club, S.W.*
- 1862 *Rigby Col. Christopher Palmer, C.B., H.M.B. Consul, *Zanzibar; and Oriental Club, W.*
- 1862 Rigby, Joseph D., Esq. *Kew-green, Middlesex, W.*
- 1860 Rintoul, Robert, Esq. *Windham Club, S.W.*
- 1830 *Robe, Maj.-General Fred. Holt, C.B. *U. S. Club, S.W.; and 5, Palace-gardens-terrace, Kensington, W.*
- 1862 Roberts, Arthur, Esq. *Ormond-house, A, Old Kent-road, S.E.*
- 1861 1330Roberts, Capt. E. Wynne. *30, King's-road, Brighton.*
- 1860 Robertson, D. Brooke, Esq., H.B.M.'s Consul, *Canton.*
- 1861 *Robertson, Graham Moore, Esq. *21, Cleveland-square, Hyde-park, W.*
- 1853 Robinson, Albert, Esq., C.E. *35, Great George-street, Westminster, S.W.*
- 1860 Robinson, Benjamin Coulson, Esq. *8, King's Bench-walk, Temple, E.C.; and 43, Mecklenburg-square, W.C.*
- 1830 *Robinson, Captain Charles G., R.N. *16, Delamere-ter., Upper Westbourne-terrace, W.*
- 1859 Robinson, Capt. D. G. *Staff of the Great Trigonometrical Survey, Rawul Pindé, Punjab.*
- 1859 Robinson, Sir Hercules G. P. *Governor of Hong-Kong.*
- Robinson, Lieut.-Col. Sir John Stephen, Bart. *Rokeby Hall, Dunleer, Ireland; and Arthur's Club, S.W.*
- 1862 Robinson, Thos. Fleming, Esq., F.R.S. *2, Horatio-terrace, Ormond-road, Old Kent-road, S.E.*
- 1850 1340*Robinson, Walter F., Esq., Commander R.N. *Junior United Service Club, S.W.*
- 1854 Roche, Antonin, Esq. *Educational Institute, Cadogan-gardens, Sloane-st., S.W.*
- 1830 *Rodd, James Bennell, Esq. *40, Winpole-street, W.*
- 1860 Roe, John Septimus, Esq., Surveyor-General, Western Australia; and Messrs. *Stüwell, Arundel-street, Strand, W.C.*
- 1860 Rogers, Henry Darwin, Esq. *Professor of Natural History, College, Glasgow.*
- 1830 *Roget, Peter M., Esq., M.D., F.R.S. *18, Upper Bedford-place, Russell-sq., W.C.*
- 1861 Rokeby, Lieut. Langham, R.M. *Conserv. Club, S.W.; and R. M. Barracks, Chatham.*
- 1861 Rollo, Lord. *18, Upper Hyde-park-gardens, W.; and Dumcrieff-castle, Moffat, N.B.*
- 1834 *Rose, the Right Hon. Sir George, F.R.S., LL.D. *4, Hyde-park-gardens, W.; and 25, Southampton-buildings, Chancery-lane, W.C.*
- 1861 Rose, Jas. Anderson, Esq. *Wandsworth, Surrey, S.W.; and 11, Salisbury-st., W.C.*

Year of
Election.

- 1857 1350* Rose, Right Hon. Wm. A., Lord Mayor. *Mansion House, E.C.; 63, Upper Thames-street, E.C.; and Befons, Crawford.*
- 1857 Ross, John, Esq., M.A. 2, *Brabant-court, Philpot-lane, E.C.*
- 1844 *Rosse, William, Earl of, M.A., F.R.S. *Birrcastle, Parsonstown, King's County, Ireland.*
- 1862 Roupell, Robert Priolo, Esq., M.A., Q.C. 13, *Park-lane, W.*
- 1839 *Rous, Vice-Admiral the Hon. Henry John. 13, *Berkeley-square, W.*
- 1859 Rowden, Rev. G. Croke. *Oak Lawn, Weybridge.*
- 1862 Rowe, Sir Joshua, C.B., late Chief Justice of Jamaica. 10, *Queen Anne-street, Cavendish-square, W.*
- 1856 Rucker, J. Anthony, Esq. *Blackheath, S.E.*
- 1861 *Rumbold, Charles James Augustus, Esq. *Downing College, Cambridge.*
- 1861 Rumbold, Thomas Henry, Esq. 1, *Eccleston-square, S.W.*
- 1860 1360 Rumley, Major-General Randall, V.P. Council of Military Education. 9, *Eaton-place, S.W.*
- 1858 *Russell, Arthur John Edward, Esq., M.P. 2, *Audley-square, W.*
- 1830 *Russell, Jesse Watts, Esq., D.C.L., F.R.S. *Ham-hall, Staffordshire.*
- 1830 Russell, John, Earl, F.R.S. 37, *Chesham-place, S.W.; Pembroke-lodge, Richmond, S.W.; Endsleigh-ho., Devon; and 'Gart-ho., near Callandar, N.B.*
- 1860 Russell, Wm. Howard, Esq., LL.D. 18, *Sumner-place, Onslow-square, S.W.*
- 1860 Rutherford, John, Esq. 2, *Cavendish-place, Cavendish-square, W.*
- 1857 *Ryder, Capt. Alfred P., R.N. *U.S. Club, S.W.; and Launde-abbey, Uppingham.*
- 1858 Ryder, John Northcote, Esq. *Messrs. Penn and Co., Greenwich, S.E.*
- 1852 Sabine, Major-General Edw., R.A., Pres. R.S., F.R.A.S., &c. &c. 13, *Ashley-place, Victoria-street, Westminster, S.W.; and Woolwich, S.E.*
- 1847 St. Asaph, Rt. Rev. Thos. Vowler Short, Bishop of. *Palace, St. Asaph, N. Wales.*
- 1857 1370 St. David's, Connop Thirlwall, Bishop of. *Abergelly-palace, Carmarthen.*
- 1862 St. John, Spenser, Esq., Chargé d'Affaires, Port-au-Prince, Haiti. 28, *Grove-end-road, St. John's-wood, N.W.*
- 1840 St. Leger, Anthony B., Esq. 10, *Berkeley-square, W.; and 22, Baker-street, Portman-square, W.*
- 1857 St. Vincent, Edward, Viscount. *Meaford Stone, Staffordshire.*
- 1845 *Salomons, David, Esq., M.P., Alderman, F.R.A.S. 3, *Great Cumberland-place, Hyde-park, W.; and Broom-hill, near Tunbridge-Wells.*
- 1861 Salting, William Levering, Esq. 13, *King's Bench-walk, Temple, E.C.*
- 1861 *Sandbach, Wm. Robertson, Esq. *Care of Messrs Tinsie & Co., Liverpool.*
- 1862 Sanford, Henry Ayshford, Esq. 23, *Cadogan-place, W.; and Nyncehead-court, Wellington, Somerset.*
- 1860 Sarel, Lt.-Col. H. A., 17th Lancers. *Army and Navy Club, S.W.; and Shanghai.*
- 1862 Sargood, F. J., Esq. *Moorgate-street-buildings, E.C.*
- 1860 1380 Sartoris, Alfred, Esq. 64, *Rutland-gate, S.W.*
- 1852 Saumarez, Captain Thomas, R.N. *Army and Navy Club, S.W.; and Millbrook-house, Jersey.*

- Year of Election.
- 1863 Sayer, Captain Frederick. *Gibraltar; and Manor-house, Richmond, S.*
- 1838 Scarlett, Lieut.-General the Hon. Sir J. Yorke, K.C.B. *Portsmouth.*
- 1861 Schenley, Edward W. H., Esq. 14, *Princes-gate, S.W.*
- 1859 Scott, Lord Henry. 37, *Belgrave-square, S.W.*
- 1861 Scott, Hercules, Esq. *Brotherton, near Montrose, N.B.*
- 1855 Scott, Vice-Admiral James, C.B. *United Service Club, S.W.*
- 1862 Scott, Rev. Thomas, M.A. 1, *Mount-place, London Hospital, E.*
- 1840 *Scrivener, J. F. P., Esq. 20, *Bryanston-square, W.; and Ramridge-house, near Andover, Hants.*
- 1861 1390 Searight, James, Esq. *Bedford-hill, Balham, S.*
- 1830 *Sedgwick, the Rev. A., Woodwardian Lecturer, M.A., F.R.S. *Athenæum Club, S.W.; and Cambridge.*
- 1862 Seemann, Berthold, Esq., PH. DR., F.L.S. 22, *Canonbury-square, N.*
- 1858 *Serocold, Charles P., Esq. *Brewery, Liquorpond-street, E.C.*
- 1853 Sevin, Charles, Esq. 155, *Fenchurch-street, E.C.*
- 1853 Sewell, Henry, Esq. 75, *Old Broad-st., E.C.; and Stamford-hill, N.*
- 1858 Seymour, George, Esq. 17, *Gracechurch-street, E.C.; and Streatham, S.*
- 1855 Seymour, Admiral Sir Geo. F., K.C.B., G.C.H. 115, *Eaton-square, S.W.*
- 1853 *Seymour, Henry Danby, Esq., M.P. 39, *Upper Grosvenor-street, W.; Knoley-Hindon, Wilts; and Glastonbury, Somersetshire.*
- 1854 *Shadwell, Captain Charles F. A., R.N., C.B. *Slough.*
- 1860 1400 *Shadwell, Lieut.-Col. Lawrence, C.B. *Cox and Co.*
- 1861 Shaffner, Col. Taliaferro P., U.S. 62, *Moorgate-street, E.C.; 49, Weymouth-street, Portland-place, W.; and Louisville, Kentucky, U.S.*
- 1856 *Share, James Masters, Esq., R.N. *H.M.S. 'Calcutta,' East Indies; and Front-street, Tynemouth, Northumberland.*
- 1861 Sharp, Peter, Esq. *Care of Edward B. Bostock, Esq., 16, Lorraine-pl., Holloway, N.*
- 1861 *Sharpe, William John, Esq. 1, *Victoria-street, Westminster, S.W.; and Norwood, Surrey, S.*
- 1861 Shaw, John Ralph, Esq. *Sand-hey, Heylake, Birkenhead.*
- 1858 Shea, John, Esq., M.D., Surgeon R.N. 84, *Blackfriars-road, S.*
- 1846 Sheffield, George A. F. C., Earl of. 20, *Portland-pl., W.; and Sheffield-pl., Sussex.*
- 1857 Sheil, Major-Gen. Sir Justin, K.C.B. 13, *Eaton-place, Belgrave-square, S.W.*
- 1857 Shelburne, Henry, Earl of. *Lansdowne-house, Berkeley-square, W.*
- 1861 1410 Shephard, Chas. Douglas, Esq., Surg. R.N. *The Elms, near Chandle, Staffordshire.*
- 1861 Shephard, Rev. Edward John, M.A. *Trotterscliffe, Kent.*
- 1860 Sherer, John, Esq. *Manston-cottage, Eden-grove, Carmell-pl., Holloway, N.*
- 1860 Sheridan, H. Brinsley, Esq., M.P. *Bellevue-house, Parson's-green, Fulham, S.W.*
- 1857 Sherrin, Joseph Samuel, Esq., LL.D., PH. DR. *Leyton-house, Leyton-crescent, Kentish-town, N.W.*
- 1859 *Sherwill, Lt.-Col. W. S., F.G.S. *Prof. of Surveying, Civil Engr. College, Calcutta; and Perth, N.B.*
- 1858 *Shipley, Conway M., Esq. *Army and Navy Club, S.W.; and Raheny, Dublin.*
- 1862 Showers, Major Charles S.

Year of
Election.

- 1856 Shuttleworth, Sir J. P. Kay, Bart. 38, Gloucester-square, W.; and Gauthorp-hall, Burnley, Lancashire.
- 1859 Silver, the Rev. Fred., M.A., F.R.A.S. Norton Rectory, Market Drayton, Salop.
- 1859 1420* Silver, Stephen Wm., Esq. 66, Cornhill, E.C.; and Norwood-lodge, Lower Norwood, S.
- 1853 Silver, William, Esq., M.A., Barrister-at-Law. Addison-road, Kensington, W.
- 1859 Sim, Captain Charles, R.E., Surveyor-General, Ceylon.
- 1860 Sim, John Coysgame, Esq. 39, Old Broad-street, E.C.
- 1853 Simmons, Edward R., Esq., Barrister-at-Law. 13a, North Audley-street, W.
- 1848 Simmons, Colonel John L. A., R.E., C.B. H. B. M.'s Consul, Warsaw; Junior United Service Club, S.W.
- 1853 Simpkinson, Lieut. Francis G., R.N. 55, Victoria-street, Westminster, S.W.
- 1862 Simpson, Henry Bridgeman, Esq. 44, Upper Grosvenor-street, W.
- 1861 Simpson, James, Esq., C.E., F.G.S. 29, Great George-street, Westminster, S.W.
- 1857 Sitwell, Major W. H. Junior United Service Club, S.W.
- 1858 1430 Skelmersdale, Edward, Lord. Lattom-park, Ormskirk, Lancashire.
- 1862 Skinner, Russell Morland, Esq. 8, Westborne-crescent, Hyde-park, W.
- 1861 Sladen, Rev. Edward Henry Mainwaring. Alton, near Marlborough, Wilts.
- 1861 Sligo, G. J. Browne, Marquis of. 14, Mansfield-st., W.; and Westport, Co. Mayo.
- 1860 *Smith, Augustus Henry, Esq. Bron Ceris, Carnarvon, North Wales.
- 1855 Smith, Rev. Brownrigg, M.A. Shepherd-lane, Drixton, S.
- 1859 Smith, Edward, Esq. Dublin Castle.
- 1836 *Smith, Edward Osborne, Esq., F.S.A., &c. 21, Cornwall-terrace, Regent's-park, N.W.
- 1853 Smith, George, Esq. Peru.
- 1857 Smith, George R., Esq. 73, Eaton-square, S.W.; and Telsden-park, Surrey.
- 1861 1440 Smith, H. S. Dazley, Esq., M.A. United University Club, S.W.
- 1860 Smith, Henry W. Seymour, Esq. Sheen-mount, East Sheen, Surrey.
- 1857 *Smith, Horace, Esq. Broxbourne-borough, Huddlesdon.
- 1830 *Smith, James, Esq., F.R.S.L. & E. Athenaeum Club, S.W.; & Jordan-hill, Glasgow.
- 1861 Smith, Jervoise, Esq. 47, Belgrave-square, S.W.
- 1854 Smith, John, Esq., Memb. Geograph. Soc. Bombay. 7, Mincing-lane, E.C.
- 1853 Smith, John Harrison, Esq. 49, Interness-terrace, W.
- 1853 Smith, John Henry, Esq. 16, Pall-mall, S.W.; and Purley, Croydon, Surrey.
- 1861 Smith, J. Sidney, Esq., Barrister-at-Law. 1, Stone-buildings, Lincoln's-inn, W.C.
- 1861 *Smith, Joseph Travers. 25, Throgmorton-street, E.C.
- 1838 1450 *Smith, Octavius Henry, Esq. Thames-bank, Westminster, S.W.
- 1857 Smith, Captain Philip, Grenadier Guards.
- 1839 Smith, Rev. R. Carter. Charlton-rectory, S.E.
- 1841 *Smith, Thomas, Esq.
- 1860 Smith, William, Esq., C.E. 19, Salisbury-street, Strand, W.C.
- 1859 *Smith, W. Castle, Esq. 1, Gloucester-terrace, Regent's-park, N.W.
- 1857 Smith, Wm. Gregory, Esq. Hudson-bay Company, Fenchurch-street, E.C.
- 1859 Smith, William Henry, Esq. 1, Hyde-park-street, W.

Year of
Election.

- 1837 *Smyth, Captain William, R.N. *Richmond-house, Ryde, Isle of Wight.*
- 1830 *Smyth, Vice-Admiral William Henry, K.S.F., D.C.L., F.R.S., V.P.S.A., F.R.A.S.,
Hon. M.B.L.A., Corr. Inst. Fr., &c. &c. *Athenaeum Club, S.W.; and St. John's-
lodge, near Aylesbury, Bucks.*
- 1850 1460 *Smythe, Colonel William J., R.A.
- 1861 Soldan, Don Marino Felipe Paz. *Lima; and 21A, Hanover-square, W.*
- 1839 *Somers, Charles, Earl. 33, *Prince's-gate, S.W.; Eastnor-castle, Hereford-
shire; and The Priory, Reigate, Surrey.*
- 1862 Somerset, Capt. Leveson E. H., R.N. *Southgate, near Leighton-Buzzard.*
- 1858 *Somes, Joseph, Esq., M.P. *Fortismere, Murrell-hill, N.*
- 1855 Sopwith, Thomas, Esq., M.A., C.E., F.R.S. 43, *Cleveland-sq., Hyde-park, W.;
and Allenheads, Haydon-bridge, Newcastle-on-Tyne.*
- 1845 *Sotheby, Lt.-Col. Fred. S., C.B., F.R.A.S. 3, *Portugal-street, Grosvenor-sq., W.*
- 1861 South, John Flint, Esq. *St. Thomas' Hospital, S.E.; and Blackheath-park, S.E.*
- 1860 Southesk, James Carnegie, Earl of. *Kinnaird-castle, Brechin, N.B.*
- 1853 Southey, Henry Sedgfield, Esq., Barrister-at-Law. *Athenaeum Club, S.W.*
- 1860 1470 *Southey, Jas. Lowther, Esq. *Leacroft, Hurstpierpoint, Sussex.*
- 1857 *Speke, Capt. John Hanning. *Jordans, Ilminster, Somerset.*
- 1861 Spofforth, Markham, Esq. 3, *Porchester-terrace, W.*
- 1830 *Spottiswoode, A., Esq. 19, *Chester-street, Belgrave-square, S.W.*
- 1855 *Spottiswoode, William, Esq., F.R.S. 19, *Chester-street, Belgrave-square, S.W.*
- 1859 *Spratt, Capt. Thos. A. B., R.N., C.B. *H. M. S. 'Medina,' Mediterranean;
and 61, Ebury-street, Piccadilly, S.W.*
- 1857 Spring-Rice, Hon. S. E. (Deputy-Chairman of the Board of Customs). *Mount
Trenchard, Fynes, Ireland.*
- 1859 Stafford, Edward W., Esq. *Colonial Secretary of New Zealand.*
- 1853 Stanford, Edward, Esq. 6, *Charing-cross, S.W.*
- 1855 Stanhope, Philip Henry, Earl, Pres. Soc. of Antiquaries. 3, *Grosvenor-place-
houses, Grosvenor-place, S.W.; and Chevening, Sevenoaks, Kent.*
- 1860 1480 *Stanhope, Walter Spencer, Esq. *Cannon-hall, Barnsley, Yorkshire.*
- 1856 Staniland, William, Esq., C.E. *The Crescent, Selby, Yorkshire.*
- 1856 Stanley, Edmund Hill, Esq. *Craven-hotel, Strand, W.C.*
- 1853 *Stanley, Edward Henry, Lord, M.P., D.C.L. 23, *St. James's-square, S.W.*
- 1856 Statham, John Lee, Esq. *Cavendish Club, Regent-street, W.*
- 1836 Staveley, Thomas, Esq. *Horswood-house, Southborough, Tunbridge-Wells.*
- 1858 Staveley, Thos. G., Esq. *Foreign Office; and 24, Cambridge-st., Hyde-park, W.*
- 1850 Steele, Colonel Thomas M., C.B., Coldstream Guards. 36, *Chester-square, S.W.*
- 1830 *Stephen, Sir George. *Melbourne.*
- 1857 Stephenson, Sir R. Macdonald, C.E. 6, *Upper Hyde-park-gardens, W.; and
East-cottage, Worthing.*
- 1861 1490 Stepney, Col. S. Cowell. 5, *St. George's-place, Hyde-park-corner, W.*
- 1860 Sterling, Col. Sir Anthony. *United Service Club, S.W.; and Cox and Co.*
- 1862 Sterry, Henry, Esq. 7, *Paragon, Southwark, S.E.*
- 1854 Stevens, Frederic Perkins, Esq. *Melbourne, Australia.*

Year of
Election.

- 1855 Stevens, Henry, Esq., F.S.A. 4, *Trafalgar-square, Charing-cross, W.C.*
- 1841 Stevenson, Thomas, Esq., F.S.A. 37, *Upper Grosvenor-street, W.*
- 1861 Stewart, Alex. Jas. Robt., Esq. 12, *Belgrave-sq., S.W.*; and *Ard-house, Donegal.*
- 1860 *Stewart, Major J. H. M. Shaw, Royal Madras Engineers. *Vizagapatam, India.*
- 1860 Stewart, Major Patric, Bengal Engineers. 8, *Lower Belgrave-street, S.W.*
- 1860 Stirling, Capt. Frederick Henry, R.N. *H. M. S. 'Hero.'*
- 1841 1500 Stirling, Vice-Admiral Sir James. *United Service Club, S.W.*
- 1860 *Stirling, William, Esq., M.P. 128, *Park-st., Grosvenor-sq., W.*
- 1860 Stocker, John Palmer, Esq. 93, *Oxford-terrace, Hyde-park, W.*
- 1858 Stoddart, George, Esq. *Collingwood, Torquay, Devon.*
- 1845 *Stokes, Capt. John Lort, R.N. *U. S. Club, S.W.*; and *Haverfordwest, Wales.*
- 1858 Stopford, James Sydney, Esq. 18, *Scille-row, W.*
- 1861 Stracey, Sir Henry, Bart., M.P. 39, *Dover-street, Piccadilly, W.*
- 1861 Strange, Lieut.-Col. Alexander. 18, *Walton-place, Hans-place, Sloane-st., S.W.*
- 1858 Strangford, Percy Ellen, Viscount. 19, *Mansfield-street, W.*
- 1858 Stratford de Redcliffe, Stratford Canning, Viscount. 29, *Grosvenor-square, W.*
- 1860 1510 Stratheden and Campbell, Wm. F. Campbell, Lord. *Stratheden-house, Knights-bridge, S.W.*
- 1860 Strickland, Edward, Commissary-General. *Barbadoes, W. Indies.*
- 1853 Strutt, George H., Esq., F.R.A.S. *Bridgehill, Belper.*
- 1858 Strutt, Captain Hammel Ingold. *Examiner Royal Mail Steam Company, Southampton.*
- 1859 *Strutt, Captain William. *Palace, Kent.*
- 1853 *Strzelecki, Count P. E. de, C.B., F.R.S. 206, *Scille-row, W.*
- 1859 Stuart, Lieut.-Col. J. F. Dudley Crichton, M.P., Grenadier Guards. 28, *Charles-street, St. James's, S.W.*
- 1861 Stuart, Vice-Chancellor Sir John. 11 and 12, *Old-buildings, Lincoln's-inn, W.C.*; 5, *Queen's-gate, Hyde-park, W.*; and *Grusharnish, Isle of Skye, Invernesshire.*
- 1834 *Sturge, Thomas, Esq. *Northfleet, Kent.*
- 1833 Start, Capt. Charles, F.L.S. *St. Edmund's, Ticoli, Cheltenham.*
- 1862 1520 Stutfield, William, Esq. 15, *Leinster-terrace, Hyde-park, W.*; and *Mystole-park, Canterbury.*
- 1857 Sullivan, Captain Bartholomew J., R.N., C.B. *Board of Trade, S.W.*
- 1860 Sullivan, John W., Esq. 11, *Home-park, Stoke, Devonport.*
- 1862 Surridge, Henry Arthur Dillon, Esq., B.A. 31, *Lower Grosvenor-street, W.*
- 1862 Surtees, Capt. Charles Freville. *Chalcott-house, Long Ditton, Surrey.*
- 1861 *Sutherland, George Granville William, the Duke of. *Stafford-house, St. James's Palace, S.W.*
- 1856 Sutherland, Kenneth L., Esq., Paymaster R.N., Barrister. *June. U.S. Club, S.W. Chesterfield-house, Weymouth*; and *the Royal Yacht, Portsmouth.*
- 1840 *Sutherland, Robert, Esq. *Carmona, Bank, Dunoon, Argyllshire.*
- 1857 Swanzy, Andrew, Esq. 38, *Cannon-street, E.C.*
- 1857 *Sweeting, Robert, Esq. 7, *Clement's-lane, Lombard-street, E.C.*; and *London-hill, Harrow.*

Year of Election.	
1836	1530*Swinburne, Rear-Admiral Charles H. 18, <i>Gravenor-place, W.</i> ; and <i>Capheaton, near Newcastle-upon-Tyne.</i>
1862	*Swinburne, Lieut. Sir John, Bart., R.N. <i>Capheaton, Newcastle-on-Tyne.</i>
1859	Sykes, Christopher, Esq. <i>Slodmere, Malton.</i>
1851	Sykes, Colonel William Henry, M.P., F.R.S., Hon. M.R.I.A. <i>Athenæum Club, S.W.</i> ; and 47, <i>Albion-street, Hyde-park, W.</i>
1852	*Syngé, Major Millington H., R.E. <i>Curragh Camp, Ireland.</i>
1852	Tagart, Courtenay, Esq. <i>Reform Club, S.W.</i> ; and <i>Paris.</i>
1859	Tagart, Francis, Esq. 31, <i>Craven-hill-gardens, Hyde-park, W.</i>
1857	*Tait, Robert, Esq. 14, <i>Queen Anne-street, W.</i>
1861	Talbot, the Hon. Wellington P. Manvers Chetwynd. <i>Honeybourne, Broadway.</i>
1861	Talbot de Malahide, Lord. <i>Malahide-castle, Co. Dublin.</i>
1861	1540Tayler, Joseph Walter, Esq. 42, <i>Tavistock-terrace, Upper Holloway, N.</i>
1861	Taylor, Lieut. A. Dundas, L.N. 14, <i>St. James's-square, S.W.</i>
1854	*Taylor, John Stopford, Esq., M.D. 1, <i>Springfield, St. Anne-street, Liverpool.</i>
1857	Teesdale, John M., Esq. <i>Downage-house, Hendon, N.W.</i>
1860	Templeton, John, Esq. 12, <i>College-terrace, Islington, N.</i>
1861	Templeton, Viscount. 2F, <i>Albany, W.</i> ; and <i>Castle Upton, Belfast.</i>
1857	Tennant, Professor James. 149, <i>Strand, W.C.</i>
1860	Tennant, Major J. F., Bengal Engrs. <i>Director of the Observatory, Madras.</i>
1830	*Thatcher, Colonel, E.I.C.
1861	Theobald, James, Esq., M.A. <i>R. T. Yacht Club, Albemarle-street, W.</i> ; and <i>Grays, Essex.</i>
1854	1550Thomas, Henry Harrington, Esq. <i>Lanedowne-crescent, Bath.</i>
1862	Thomas, John, Esq. 109, <i>Great Portland-street, W.</i>
1859	Thompson, Thomas A., Esq. <i>London and County Bank, Cambridge.</i>
1854	Thompson, William C., Esq. 81, <i>Cambridge-terrace, Hyde-park, W.</i> ; and <i>Royal Cork Yacht Club, Queenstown.</i>
1848	*Thomson, J. Turnbull, Esq. <i>Chief Surveyor, Otago, New Zealand.</i>
1861	Thomson, Ronald Ferguson, Esq., 1st Attaché to the Persian Mission. <i>Clifford-inn, Fleet-street, E.C.</i>
1854	*Thomson, Thomas, Esq., M.D. <i>Calcutta.</i>
1862	*Thorne, Augustus, Esq. 4, <i>Culham-street, City, E.C.</i>
1847	Thornton, Rev. Thomas Cooke, M.A., M.R.I. <i>Brock-hall, near Weedon, Northants.</i>
1858	Thorold, Rev. A. W. 16, <i>Bedford-square, W.C.</i>
1854	1560Thorold, Henry, Esq. <i>Curwold, Lincolnshire.</i>
1861	Thrupp, John, Esq. 7, <i>Warwick-square, Belgrave-road, S.W.</i>
1859	Thuillier, Lt.-Colonel H. L., Surveyor-General of India. <i>Calcutta.</i>
1861	Thurburn, Capt. Henry, 14, <i>St. James's-square, S.W.</i>
1861	Thurlow, the Hon. Thos. J. Hovell. <i>British Embassy, Paris.</i>
1846	*Tindal, Charles John, Esq. <i>New South Wales.</i>
1859	Tindal, Capt. J. Symonds, R.N.

Year of
Election.

- 1839 *Tinne, John A., Esq. *Briarley, Aighburth, near Liverpool.*
- 1862 Todd, John, Esq. 17, *Victoria-road, Charlton, Kent, S.E.*
- 1853 *Tomline, George Taldy, Esq., F.S.A. *Chandos-house, Broadstairs.*
- 1853 1570 Tomline, George, Esq., M.P. 1, *Carlton-house-terrace, S.W.*
- 1835 *Tooke, Arthur Wm., Esq., M.A. *Pinner-hill-house, near Watford, Middlesex.*
- 1856 Torrance, John, Esq. 5, *Chester-place, Hyde-park-square, W.*
- 1859 Townsend, John, Esq., Lieut. R.N. *Lona, Weston-super-Mare.*
- 1846 *Towry, George Edward, Esq.
- 1858 Towson, J. Thomas, Esq. *Secretary Local Marine Board, Liverpool.*
- 1858 Tracy, the Hon. Sudeley Charles G. H. *Guards' Club, S.W.*
- 1861 Train, George Francis, Esq.
- 1862 Travers, Franklin, Esq. *Thames-villa, Walton-on-Thames; and Curcendish Club, W.*
- 1860 Travers, John Ingram, Esq. 19, *Seithin's-lane, E.C.*
- 1859 1580 Tremlett, Rev. Francis W., M.A. *Belsize-park, Hampstead, N.W.*
- 1863 Trestrail, Rev. Frederick. *Stannore-villa, Beulah-hill, Upper Norwood, S.*
- 1862 Trevelyan, Sir Charles Edward, K.C.B. 8, *Grosvenor-crescent, S.W.*
- 1830 Trevelyan, Sir Walter Calverly, Bart., M.A., F.S.A., F.L.S., F.R.S.N.A., &c. *Athenarum Club, S.W.; Wallington, Northumberland; and Nettlecombe, Somerset.*
- 1860 Trigg, John Davies, Esq. *Magdalen Hall, Oxford.*
- 1859 Tronson, Dr. J. M., Assist.-Surgeon, R.N. *H.M.S. 'Orpheus,' Sydney, New South Wales; and Mearns-street, Greenock.*
- 1858 Trotter, Alexander, Esq. *Devonshire-place-house, New-road, N.W.*
- 1839 *Truman, Dr. Matthew. 40, *Norland-square, Notting-hill, W.*
- 1862 Tuckett, Francis Fox, Esq. *Frenchay, near Bristol.*
- 1835 *Tuckett, Frederick, Esq. 4, *Mortimer-street, Cavendish-square, W.*
- 1852 1590 Tudor, Edward Owen, Esq., F.S.A. 46, *Westbourne-terrace, W.*
- 1857 Tudor, Henry, Esq. 46, *Westbourne-terrace, W.*
- 1862 Tuke, Harrington, Esq., M.D. 37, *Albemarle-street, W.*
- 1834 *Turnbull, Rev. Thomas Smith, F.R.S. *University Club, S.W.; and Blofield, Norfolk.*
- 1840 Twiss, Travers, Esq., D.C.L., F.R.S. 19, *Park-lane, W.*
- 1858 Twyford, Capt. A. W., 21st Hussars. *Cavalry Dépôt, Canterbury; Reform Club, S.W.; and Clayton Wickham, Hurstpierpoint, Sussex.*
- 1859 Tytler, Capt. W. Fraser. *Aldourie, Inverness.*
- 1862 Tyler, Edward Burnet, Esq. 6, *St. Boniface-terrace; Ventnor, I. of Wight.*
- 1862 Tyler, George, Esq. 24, *Holloway-place, Holloway-road, N.*
- 1862 Underhill, Edward Bean, Esq. 13, *Camden-square, Camden-town, N.W.*
- 1861 1600 Urisher, John, Esq. *Arthur's Club, St. James's Street, S.W.*
- 1858 *Uzielli, Theodosius, Esq. 114, *Piccadilly, W.*
- 1844 *Vacher, George, Esq. 29, *Parliament-street, S.W.*
- 1862 *Vander Byl, P. G., Esq. 3, *Upper Hyde-park-gardens, W.*
- 1845 *Vane, Lord Harry G., M.P. 1, *Grosvenor-place-house, S.W.*

Year of Election.	
1858	Vardon, Arthur, Esq. <i>Worth, Crawley, Sussex.</i>
1857	Vardon, Thomas, Esq. <i>Library, House of Commons, Palace, Westminster, S. W.</i>
1856	*Vaughan, James, Esq., F.R.C.S., Bombay Army. <i>Bombay.</i>
1861	Vaughan, J. D., Esq., Master Attendant and Marine Magistrate of Singapore.
1861	Vaughan, Nash Vaughan Edwards, Esq. <i>Rheola, near Neath; and Lanelay, near Pontyfield, Glamorganshire.</i>
1849	1610 Vaux, William S. W., Esq., M.A., F.S.A. <i>British Museum, W. C.</i>
1852	*Vavasour, Sir Henry M., Bart. <i>Travellers' Club, S. W.; and Spaldington-hall, Yorkshire.</i>
1855	Vavasour, James, Esq. 2, <i>De Crespigny-park, Denmark-hill, S.</i>
1860	Verbeke, Frederick, Esq. 41, <i>Victoria-street, Westminster, S. W.</i>
1862	Verner, Edward Wingfield, Esq. 86, <i>Eaton-square, S. W.; and Cook-abbey, Bray, Co. Wicklow.</i>
1837	*Verney, Major Sir Harry C., Bart., M.P., F.R.A.S. <i>Travellers' Club, S. W.; 32, South-street, Grosvenor-square, W.; and Claydon-house, Bucks.</i>
1857	Verrey, Charles, Esq.
1852	Verulam, James Walter, Earl of. <i>Gorhambury, near St. Alban's; Barry-hill, Surrey; and Messing-hall, Essex.</i>
1859	Vesey, Arthur, Esq. <i>Long Ditton, Kingston, Surrey, S. W.</i>
1830	Vetch, Captain James, R.E., F.R.S. 48, <i>Finchley-road, St. John's Wood, N. W.</i>
1840	1620 Vigne, G. T., Esq. <i>The Oaks, Woodford, N. E.</i>
1857	Vincent, John, Esq. 4, <i>Lamb-buildings, Temple, E. C.</i>
1858	Vines, William Reynolds, Esq., F.R.A.S. <i>Elms-grove, Ealing, W.</i>
1863	Vivian, Major Quintus, late 8th Hussars. 17, <i>Chesham-street, S. W.</i>
1838	*Vyvyan, Sir Richard Rawlinson, Bart., F.R.S. <i>Trelowarren, Cornwall.</i>
1852	Wade, Mitchell B., Esq. 66, <i>South John-street, Liverpool.</i>
1853	*Wagstaff, William Racster, Esq., M.D., M.A.
1856	Waldegrave, the Hon. Geo. Leslie. 4, <i>Harley-street, W.</i>
1862	Walker, Col. C. P. Beauchamp, C.B., Assist. Quartermaster-Gen., Shorncliffe. <i>United Service Club, S. W.; Army and Navy Club, S. W.; and Sandgate, Kent.</i>
1860	Walker, David, Esq., M.D., F.L.S., M.R.I.A. <i>Seacombe, Cheshire.</i>
1861	1630 Walker, Edward Henry, Esq. <i>Newton-bank, Chester.</i>
1863	*Walker, Frederick John, Esq. <i>St. Leonard's, Exeter.</i>
1859	*Walker, Major James, Bombay Engineers. <i>Murren, near Raicul Pindé, Punjab.</i>
1830	Walker, John, Esq., Hydreg. India Office. 9, <i>Castle-street, Holborn, W. C.</i>
1861	*Walker, John, Esq. 60, <i>Porchester-terrace, W.</i>
1858	*Walker, Captain John, H.M.'s 60th Foot. 13, <i>Westbourne-st., Hyde-park, W.</i>
1856	Walker, Joshua, Esq.
1860	Walker, Robert, Esq., M.D., Assist. Surgeon R.N. <i>H.M.S. 'Hannibal.'</i>
1853	Walker, Captain William Harrison, R.C.S. 3, <i>Gloucester-terrace, W.; and Board of Trade, S. W.</i>
1861	Walker, Rev. William Henry, M.A. <i>Necton-rectory, Shipham, Norfolk.</i>
1861	1640 Walker, William, Esq. <i>Training College, Peterborough.</i>

Year of
Election.

- 1854 Wallace, Alfred Russell, Esq. 5, *Westbourne-grove-terrace, W.*
- 1861 Wallace, Rev. Charles Hill, M.A. 20, *Sion-hill, Clifton, Bristol.*
- 1863 Wallich, George C., Esq., M.D. 17, *Campden-hill-road, W.*
- 1860 Walpole, Capt. the Hon. F. *Travellers' Club, S.W.; and Rainthorpe-hall, Long Stratton, Norfolk.*
- 1853 Walter, Henry Fraser, Esq. *Papplewick-hall, near Nottingham.*
- 1853 *Ward, George, Esq.
- 1860 Ward, Captain J. Hamilton, R.N. *Oakfield, Wimbledon-park, S.W.*
- 1861 Warder, Rev. William. *Lonsdale Mission House, Berbice; and W. M. House, Bishopsgate-street, E.C.*
- 1862 Wardlaw, John, Esq. 57, *Prince's-gate, Kensington, W.*
- 1859 1650 Warre, Arthur B., Esq. 54, *Lowndes-square, S.W.*
- 1862 Warren, Capt. Richard Pelham. *Worting-house, Basingstoke.*
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EDUCATION, Minutes of the Committee of Council on, with Appendix. 1860-61. 8vo. 1861.

THE COMMITTEE.

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BROCK, DR. M.—Bevölkerung des Französischen Kaiserreichs in ihren wichtigen statistischen Verhältnissen. 12mo. Gotha, 1861.

M. JUSTUS PERTHES.

CHAZALLON, A. M. R.—Annuaire des Marées des Côtes de France pour l'an 1861. Reinèke, Capit. 8vo. Paris, 1860.

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KELLER, M.—Notice sur la Carte des Environs de Cherbourg, donnant les Parours des Courants de Flot et de Jusant et les Etablissements de leurs Étales observés en Juillet, Août et Septembre, 1844. 8vo. pamph. Paris, 1861.

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GERMANY—

BEITRÄGE zur Statistik der freien Stadt Frankfurt, herausgegeben von der Statistischen Abtheilung des Frankfurter Vereins für Geographie und Statistik. Erster Band, 3te Theile. 4to. Frankfurt, 1861.

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GEOLOGISCHE Specialkarte des Grossherzogthums Hessen und der angrenzenden Landesgebiete im Maastabe von 1: 50,000. Herausgegeben von mittelhheinischen geologischen Verein. 8vo. Darmstadt, 1861.

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ARC du Meridien du 25° 20' entre le Danube et la Mer Glaciale, mesuré depuis 1816 jusqu'en 1855. Ouvrage composé sur les différents Matériels et rédigé par F. G. W. de Struve. Publié par l'Académie des Sciences de St. Petersburg. 2 vols., with plates in separate vol. 4to. St. Petersburg, 1857-60.

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- LE GRAS, Capit.—Mer du Nord. 3me Partie. Côtes Est de l'Angleterre. Traduction par M. A. le Gras. 8vo. Paris, 1860. DÉPÔT DE LA MARINE.

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Plan of a Stern-wheel Steamboat used on the Fraser River, with model of same.

WM. KELLY, Esq., F.R.G.S.

Portrait of Capt. R. F. Burton, Gold Medallist, F.R.G.S.

MRS. BURTON.

PRESENTATION

OF THE

GOLD MEDALS

TO THE REPRESENTATIVE OF THE LATE RICHARD O'HARA BURKE
AND TO CAPTAIN BLAKISTON, R.A.

THE PRESIDENT said—The first duty which I have to perform is to present the medals. But before I do so I may, perhaps, be allowed to remind you that these honours are not the gift of a society of private gentlemen, who have assumed to themselves the right of so distinguishing certain merits of their own selection, according to rules fixed by their own good pleasure; these medals are the gift of that supreme authority of this realm which is the source of all public honour and distinction. And just as peerages and knighthoods are given by the Crown, at the instance of the Prime Minister; just as Victoria Crosses are given by the Crown, at the instance of the Commander-in-Chief; so the Crown has selected the President and Council of the Royal Geographical Society to award the honours which it considers to be due to those who have most distinguished themselves by the promotion of geographical science and discovery.

If you will look back to our records, you will see that this Royal trust has been fulfilled by the President and Council of the Royal Geographical Society with scrupulous fidelity; you will find no trace of political bias, or of personal favour, or of what is more difficult to resist, the influence of popular sympathies. Now it is this distinction, proceeding from the highest power of the realm, and assigned by the most competent and impartial judges, that I am about to present.

I will request Dr. Norton Shaw to read the formal judicial decision, by which the Council of the Royal Geographical Society has awarded the Founder's premium for this year.

Dr. Shaw then read as follows:—"The Founder's Gold Medal has been awarded to the representative of the late Richard O'Hara

Burke, in remembrance of that gallant explorer, who, with his companions Wills and Gray, perished after having traversed the continent of Australia from south to north. The Council has also awarded to Mr. John King, the sole survivor of the expedition under Burke, a gold watch, with a suitable inscription, as a recompence for his faithful and meritorious conduct."

The President then addressed the Duke of Newcastle, her Majesty's Secretary of State for the Colonies, as follows:—

"My LORD DUKE,—We rejoice to see you here within our walls, that we may have the opportunity of testifying to you our thanks for the cordial and liberal manner in which you have accepted the co-operation of this Society, whenever we could in any way contribute to the public service. The colonies over which you preside, must see in your presence this day, new evidence of the interest taken by Her Majesty's Government in every event which bears upon their permanent welfare; and there have been few events within the history of our Australian colonies, destined to have a more beneficial influence upon their progress, than this passage from sea to sea by the expedition of the late Mr. Burke.

"I consign this medal to your hands, to be delivered to his nearest relative. Oh! that this posthumous tribute of a nation's gratitude could in any way assuage the sorrow and mitigate the bereavement of the many friends and admirers whom he has left to bewail his loss."

The DUKE OF NEWCASTLE assured the meeting that he attended there in fulfilment of what he considered a public duty, at once painful and agreeable—painful because he received at the hands of the President this token of admiration of one of England's noble men, for transmission not to him for whose merits it had been bestowed, and who was now cold on the shores of that great country on which he had conferred such signal benefits, but to those relatives who, like the colony itself, must look back upon his memory with affectionate admiration. At the same time it was an agreeable duty, because it showed that this Society, as well as the country at large, had not been insensible to the merits of the individual or the services he had rendered to science and civilization. These medals, as it had been correctly stated by the Chairman, were not conferred at the option of private individuals, but by the Crown, through the instrumentality of the President and Fellows of this Society; but the medals must bear an additional value when it was recollected that they were not bestowed upon any arbitrary principles, but by gentlemen eminent for their knowledge and experience, and who were thoroughly com-

petent to appreciate the merit they rewarded. Standing before them as he did, entrusted by Her Majesty with the seals of the Colonial Office, he felt bound to express his admiration of the colony of Victoria in instituting this expedition. Victoria was perhaps one of the Australian colonies least interested in the result of Mr. Burke's expedition; at the same time it entered upon it with that public spirit which had actuated this country in similar expeditions—a desire to benefit science and to extend civilization throughout Australia, of which the colony of Victoria formed so important a part. But if credit was due to Victoria for this, it was also due to the other colonies to acknowledge that they also set on foot expeditions when the fate of Mr. Burke was held in the balance, and when it was hoped that expeditions might afford aid, or probably effect his rescue. It would be unnecessary to say much upon the individual merits of Mr. Burke, for most of those present had read that touching despatch of Sir Henry Barkly in which he narrated the circumstances of Mr. Burke's untimely fate. In him they had lost a man as eminent, as gallant, and as great as that intrepid brother who perished on the banks of the Danube. He felt certain that the Society had done well in awarding its medal to so distinguished an explorer. It would not be proper for him to pledge the Colonial Office to anything on such an occasion, but he would say that on all such matters as this, the authorities of his office looked to the Royal Geographical Society as a guide and instructor, and, although it might not be always possible to follow what was suggested, it would always be with great deference that they received suggestions, and with great reluctance that they were unable to carry them out. On the part of the friends of Mr. Burke he thanked the Society, and assured them that the medal should be duly transmitted to them.

At the desire of the President, the terms of the award of the Patron's Gold Medal were then read by Dr. Shaw:—"The Patron's Gold Medal has been awarded to Captain Thomas Blakiston, of the Royal Artillery, for his survey of the river Yang-tsze-Kiang, from Yo-chow to Ping-shan, extending nine hundred miles beyond the farthest point previously reached by Englishmen."

The PRESIDENT then said,—

"CAPTAIN BLAKISTON,—Having already had the pleasure of being acquainted with you in private life, I rejoice that it should be from my hands that you receive this honourable distinction, awarded you by the Council of the Royal Geographical Society."

CAPTAIN BLAKISTON, expressed his gratification at receiving the medal, but regretted that in a private expedition any distinction had to be made. He wished that it could be divided into four portions, so that each of his companions might receive a share; but that not being possible, he should consider that he held it in trust for them.

He tendered his thanks to the President and Council for the award, and to the members present for their flattering reception, and concluded by saying that he should ever remember that the "Upper Yang-tsze Expedition" had gained one of the highest honours accessible to geographers.

A D D R E S S
TO THE
ROYAL GEOGRAPHICAL SOCIETY
OF LONDON;

Delivered at the Anniversary Meeting on the 26th May, 1862,

By THE LORD ASHBURTON,
PRESIDENT.

O B I T U A R Y.

IN the Report which has been read, you have heard of the increasing numbers of this Society—numbers which begin even to exceed the space which we can assign to them. But at the same time there is another review to make—the melancholy review of our losses. There have passed away from among us men of European reputations, lamented not only by the friends they loved, but by the public they have served; who have laboured in their day not only for the generations among whom they lived, but for all time and for all humanity. As the narrow circle of kindred within which a man has lived, hasten with pious reverence to celebrate solemn obsequies over his tomb, so the wider circle within which he has worked, find a pride and glory in recording the worth and recounting the actions of the fellow-labourer they deplore.

I begin our melancholy list by recording the death of our Royal Vice-Patron, the late Prince Consort. His vigilant eye was not confined to the science of geography alone; it extended to every science, every pursuit which could in any way contribute to the welfare of his fellow men. Our grief for the irreparable loss we have ourselves sustained, has been still farther intensified by our

sympathy with that great Lady, our Queen and Governor, in whom we glory, and on whom we have concentrated all that we have of respect, admiration, and love.

The Prince alone could, from his universal and accurate knowledge, and his exalted position, carry out to their successful completion, a course of measures by which he hoped to secure for his adopted country an honourable supremacy in every department of science and of art. Such I believe to have been the determinate purpose of our Vice-Patron. He has passed away from among us, and where shall we find his like? Where shall we find such power, such knowledge, such earnest zeal, such deliberate wisdom, such patient endurance of opposition?

Where shall we find a constancy inspired by love to us, and elevated by the aspirations of a noble mind for the advancement of mankind? On every public and private occasion he gave to men distinguished in art, science, or literature, that social position to which they were entitled. He exerted himself by every means in his power to enlarge the sphere of education.

He organized and completed the Great Exhibition of 1851. It was then, when we came into direct conflict with other nations, that our manufacturers found that for the higher branches of their respective arts they must have French designers, French painters, and Italian modellers. They became conscious of their inferiority in taste and workmanship; they found the want of such public institutions as had facilitated in foreign countries the cultivation of the artist and the mechanic.

Public opinion thus roused, enabled the Government to carry out the Prince's views, by the establishment of schools of art and science throughout the country.

Already in 1855, enlightened foreigners were struck by the progress which had been made in four short years. Eight more have now elapsed; improvement has been going on in an accelerated ratio. A measure of progress is applied this year, by the Exhibition of 1862, to test the success of the Prince's plans and labours; but the originator of them all is not there, to hear the universal voice of praise and gratitude. His far-seeing eye is closed, his fostering hand is cold. Science has lost her noblest patron, England her surest guide.

Thomas William ATKINSON, the Siberian traveller, was born of humble parents at Cawthorne, a village in the West-Riding of Yorkshire, on the 6th of March, 1799, and the only education he

received was at its village-school. At the age of eight years he followed the plough, at ten he began to earn his own livelihood as a bricklayer's labourer and quarryman, and afterwards worked in a stonemason's yard.

In 1819 he was employed as mason in rebuilding St. Mary's (the old) Church at Barnsley, where he distinguished himself by carving some unusually fine work, and showed so much talent that he was strongly recommended to try his fortune in a larger sphere.

In accordance with this advice he went to London, and in 1827 he established himself in Upper Stamford Street, Borough, as an architect. In 1842 he left England for Hamburg, where he was engaged during 1845 in the reconstruction of the church of St. Nicholas, and where he obtained some patronage from the King of Prussia.

He next visited Egypt and Greece, and in 1846, by the advice of Baron Humboldt, went to Russia. He there formed the project of an artist's journey into Siberia; and the Emperor of Russia granted him the rare privilege of a *blank* pass throughout his Asiatic dominions. The crowning effort of Mr. Atkinson's life then commenced; he started on his journey through southern Siberia, the Kirghis Steppes, and parts of Central Asia.

On his return he published his *Travels*, entitled 'Oriental and Western Siberia,' in 1858, and 'The Upper and Lower Amoor,' &c. in 1860.

JAMES BRANT, C.B., was a gentleman well known to many travellers and tourists, from his long official connection with Eastern countries. He was appointed Vice-Consul at Trebizond, in 1830, and Consul at Erzerum in 1836, where he remained till the close of the Russian war, and was then transferred to Damascus. He retired from the service in 1860, and died suddenly last year at the age of seventy.

SIR WILLIAM CUBITT, C.E., &c.—This remarkable man, who, unaided either by powerful friends or patronage of any kind, raised himself from a comparatively humble position to one of affluence and high standing, was the author of several eminently useful inventions in various branches of mechanics. He was the engineer to the South Eastern Railway, and it was under his directions that the heavy works between Dover and Folkestone were executed, including the removal of masses of earth by the means of gunpowder, on a scale beyond what had been previously attempted. There was, indeed, scarcely any engineering work of magnitude executed during his career to which, in some way or other, he did not contribute;

his last works being the two remarkable landing-stages in the Mersey at Liverpool, and the bridge over the Medway at Rochester. He was an old and esteemed Member of the Institute of Civil Engineers, and, as their President, was, in the year 1851, chosen one of the Royal Commissioners of the Great Exhibition. In that capacity he superintended the erection of the building in Hyde Park, and, in recognition of his gratuitous services on that occasion, received at the hands of the Queen the honour of Knighthood.

Rear-Admiral the Hon. J. F. F. De Ros died at the age of fifty-seven. He passed many years of service on the American station, and wrote a 'Narrative of Travels in the United States and Canada.' He also published 'Observations on the Maritime Resources of North America, and on the State of the Dockyards and Navy.'

Vice-Admiral the Hon. Sir Richard Saunders DUNDAS, K.C.B.—This gallant officer was born in 1802, and was for a short time at Harrow School, which place he left at the age of thirteen, to enter the Royal Naval College. He first went afloat in June, 1817, and having obtained his rank of Lieutenant, was, in 1823, after some years of active service, made Commander. In the spring of 1827 he was appointed to the *Warspite*, 76; in which ship, the first of her class that ever circumnavigated the globe, he returned to England from New South Wales in the October following. After commanding the *Belvidere*, he was appointed to the *Melville*, and subsequently in that ship was present at the opening scenes of the first war in China. While there he received the thanks of Sir Gordon Bremer for his conduct at the capture of Ty-cock-tow in January, 1841, and afterwards received honourable mention in the Admiral's despatches for his gallantry in the action which preceded the capture of the fort of the Boga Tigris. From 1829 to 1830 he was Private Secretary to his father, Viscount Melville, when First Lord of the Admiralty; and in January, 1845, on the late Earl of Haddington becoming First Lord, he assisted that nobleman in a similar capacity. He was appointed Captain Superintendent of Deptford Dockyard in 1851, and in December, 1852, a Lord Commissioner of the Admiralty. In 1855 he was selected as Commander-in-Chief of the Baltic fleet, in the place of the late Admiral Sir Charles Napier. In 1857 he resumed his seat at the Admiralty Board, and continued attached to that department up to the time of his death, which took place suddenly on the 3rd June, 1861. The deceased officer received the honour of Knighthood in 1856, after the close of the Russian war.

Hugh, Earl FORTESCUE, K.G., died at Exeter on September 14th, 1861, aged seventy-eight. The deceased was educated at Brasenose College, Oxford, where he graduated B.A. in 1803, and M.A. in 1810. He first entered the House of Commons in 1804, and represented various places in that House until 1841, when he was summoned to the House of Peers. He held the office of Lord-Lieutenant of Ireland from 1839 to 1841; and from 1846 to 1850, he was Lord Steward of Her Majesty's Household. On the resignation of his father, some twenty years back, he was appointed Lord-Lieutenant and Vice-Admiral of the county of Devon. The deceased peer was Vice-President of University College, London, and a D.C.L. of Oxford. He also figured in the paths of literature, having published, with a memoir, a selection from the speeches and writings of the late Lord King, father of the present Earl of Lovelace.

Captain Walter Colquhoun GRANT, the author of an able and vivid description of Vancouver Island, published in the twenty-seventh volume of our Journal, died at Saugor, Central India, aged thirty-nine. He was the only son of the late chief of the intelligence department of the army commanded by the Duke of Wellington in the Peninsula. He did good service in the Crimean war, and again in India he assisted in the siege of Lucknow, and succeeded to the command of the regiment of irregular cavalry known as 1st Hodson's Horse. One of Captain Grant's last acts was to prepare and transmit to this Society a map and paper on Sikkim, which, however, have not yet reached their destination.

The Rev. Edward Craven HAWTREY, D.D., died at Eton College on the 27th of January of this year. Dr. Hawtreay was educated on the foundation of Eton College, where he was elected as scholar to King's College, Cambridge, in 1808, and having taken his B.A. degree in 1812, he became an Assistant-Master at Eton under the late Dr. Keate, whom he succeeded as Head Master in 1834. He held the headmastership till 1853, during which time the number of pupils increased to nearly eight hundred, and was then appointed to the provostship, rendered vacant by the death of the well known and accomplished scholar the Rev. Francis Hodgson. A volume of English Hexameters, published in 1847, and consisting mainly of translations from Goëthe, Schiller, Homer, &c., contained many contributions by Dr. Hawtreay. His contributions to the '*Arun-dines Cami*' are also well known to scholars. He printed in 1839 a volume of Italian poetry, called '*De Trilogis*,' and at Paris, some able '*Lectures on the Church Catechism*,' delivered in Eton College

Chapel in 1845-9, and a continuation of them in 1852, besides several sermons and lectures.

Robert William HAY died at Malta, aged seventy-four. He was educated at All Souls, Oxford, and filled for some time the office of Private Secretary to the late Viscount Melville when First Lord of the Admiralty. He was Under-Secretary for the Colonial Department in the year 1836.

Vice-Admiral Sir Thomas HERBERT, K.C.B., entered the navy in 1803, and was appointed to the command of the *Tamar* in 1822. In 1837, having been ashore for fourteen years, he was appointed to the *Calliope*, and proceeded to the Brazils. Subsequently he was ordered to assume the command of the naval force in Rio de la Plata. In 1840 he joined Admiral C. B. H. Ross at Valparaiso, whence in the following June he sailed for China. Arriving in the Canton River on the 10th of October, he assumed, and until the arrival of Admiral Elliot on the 20th of November, retained, the command of the blockading force. On the 7th of January, 1841, he conducted the attack on the enemy's forts at Chuenpee, where eleven powerful junks were destroyed; and on the 23rd of February, being at the time on board the *Nemesis*, he destroyed a 20-gun battery at the back of the island Anunghoy. After several other important services, a full account of which will be found in our Fellow Captain Hall's valuable work, '*The Nemesis in China*,' and having received the honour of knighthood, Sir Thomas returned home in the *Blenheim* in March, 1843. In January, 1847, he was appointed Commodore on the south-east coast of America. From February until December, 1852, he was one of the junior Lords of the Admiralty. He represented Dartmouth in the House of Commons from July, 1852, to April, 1857, and died, after a protracted illness, on August 5th, 1861.

Charles Edward LEFROY died April 16th, 1861, aged 51. Having obtained his M.A. degree at Christ Church, Oxford, in 1832, he was called to the Bar at Lincoln's Inn in the same year. In 1841 he was Secretary to the late Speaker of the House of Commons (the Right Hon. Charles Shaw Lefevre, now Viscount Eversley), and in 1856 was appointed Taxing-Master to the House of Commons. The deceased was also a J.P. for Hampshire.

James Ormiston M'WILLIAM, M.D., F.R.S., was chief medical officer to the disastrous expedition in 1841, under Captain Trotter, R.N., in which his name is familiar to all who are conversant with the history of Niger enterprise. During the return voyage of the

afflicted party, when the survivors were mostly fever-stricken, Dr. M^rWilliam and Dr. Stanger displayed an energy and devotion which demanded and obtained the most grateful acknowledgments. His experience gained on this fearful occasion has been of marked utility to subsequent travellers, and is recorded in his well-known '*Medical History of the Niger Expedition*.'

Mr. Samuel Leigh SOTHEY, who will be remembered by his great work on Block Printing, and by a smaller publication, which he had only just completed, '*Wanderings in Search of Milton's Autograph*,' was found in the early part of last June drowned in the river Dart, his death being attributed by his physician to a spasm of the heart.

Major-General Sir Claude Marten WADE, C.B., died at Bath on October 21st, 1861, aged sixty-seven. He commenced his valuable public career in 1809, by entering the military service of the East India Company, in which he rose to the rank of Lieutenant-Colonel in 1839, and afterwards received the local rank of full Colonel in India. Whilst holding his military commission he was constantly employed in various important civil posts. In 1823 he was appointed diplomatic agent at Ludianah, and in 1835 was placed in charge of our relations with Runjeet Sing and the States across the Indus. In 1838 he was sent on a special mission to Pesháwur, to join the Sikh army with Shahzuda Timur, and was the first to force the celebrated Khyber Pass. In 1848 he was nominated political agent at Malwa, in Central India, this being the last civil appointment he held.

The Rev. Dr. Joseph WOLFF, whose name is so intimately associated with Eastern travel, was the son of a Rabbi, and was born at Weilersbach, in the year 1795. He was converted to Christianity through his acquaintance with the Count of Stolberg and Bishop Seiler, and was prevailed upon to enter the Monastery of the Redemptorists at Val-Saint, near Tribourg. Being unable to convince himself of the truth of Romanism as taught there, he left Val-Saint and came to London; and after studying the Oriental languages under Dr. Lee of Cambridge, and theology under the late Rev. Charles Simeon, commenced his travels for the purpose of proclaiming the Gospel to the Jews, Mohamedans, and Pagans. He travelled in Mesopotamia, Persia, and the Crimea; incessantly preaching at every town and village he visited. From 1831 to 1834, Dr. Wolff proceeded to search for the Ten Tribes. A full account of these wanderings and of his second journey to Bokhara,

in order, if possible, to effect the liberation of Colonel Stoddart and Captain Conolly, as also of his visit to the United States, will be found in his works.

I have only recorded a few of those who have, by their labours, contributed to geographical science and discovery. There are others whose cheerful presence we miss, sedulous attendants of our meetings, contributors to our funds.*

ADMIRALTY SURVEYS.†

The Coast Surveys in course of execution under the orders of the Admiralty, both at home and abroad, have made the usual progress during the past year. They are conducted by twenty different surveying parties, one-half of whom are employed on the coasts of the United Kingdom; the remainder in the colonies of Australia, Cape of Good Hope, West Indies, Nova Scotia, Newfoundland, and Vancouver Island; and on the foreign coasts of Syria, Cyrenaica, in Banka Strait, China, and Japan.

England.—The Coast Survey of the British Isles is so nearly complete that the account of its advance from year to year must necessarily be made up of minor topographical details, which would be out of place in a general view of the progress of geography all over the globe, were it not for their important bearing on navigation, and their being of special interest to the numerous class connected with the vast commercial marine of the country. Beginning then with the south coast: the shores of the Solent, Southampton Water, and Portsmouth Harbour have been re-examined by Mr. Scott Taylor, R.N., in order to insert the several changes that have been caused by the progress of the nation and the requirements of trade during the last sixteen years, when the former survey was made. Questions, too, connected with deep-water docks, and the extension of Portsmouth Harbour, have led to a

* Of these we have to regret also the loss of Robert Armstrong, Esq.; David Baillie, Esq.; David Barclay, Esq.; Rev. Fred. Bliss; H. M. Chadwick, Esq.; Capt. David Spiritt Cooper; Major-General Thos. Dickenson; Dr. Christopher Elliot; William Francis Gamul Farmer; William Henry Fitton, M.D.; William Gausson, Esq.; John Robert Godley, Esq.; Sir J. R. G. Graham, Bart.; Major-General George Judd Harding; Lord Herbert of Lee; Mathew Edward Hoare, Esq.; Edward B. Lawrence, Esq.; Charles Lee, Esq.; E. Magrath, Esq.; Major J. A. Moore; R. Denby Wodifield.

† Rear-Admiral J. Washington, Hydrographer.

critical examination of the early surveys of this region—and apparently the depth of water on Portsmouth Bar is found to be precisely the same.

In the Channel Islands Mr. Richards, R.N., is continuing his re-examination, and, by patiently struggling against the rapid tides that prevail around that group, has succeeded in discovering many small rocks which might have wrecked a vessel. On the coast of Devon Captain Stokes, R.N., with his staff, has completed the survey of the Yealm River and the soundings in Bigbury Bay; and the chart of Plymouth Sound by Commander Cox, on the scale of 6 inches to a mile, has been published. In the Scilly Isles Captain George Williams has made much progress in the re-examination of that intricate group. In the Bristol Channel Commander Alldridge has continued the survey of the coast of Glamorganshire, and sounded over 180 square miles of ground; while Mr. Calver, R.N., with his staff, on the east coast, has continued the survey of the upper part of the Humber from Hull to Goole, has re-examined the eastern gateway leading into Yarmouth Roads, and the Shingles channel at the mouth of the Thames.

Scotland.—In Argyllshire Commander Bedford and his staff have surveyed 14 miles of the open north-west coast of Mull, and 9 miles of Loch Linnhe, with 76 miles of the shores of Loch Awe, besides sounding over an area of 60 miles. Captain Otter and staff have surveyed Loch Lomond, the Sound of Barra in the Hebrides, a portion of the Isles of Harris and Benbecula, and a part of Rum; while Mr. Jeffery has brought to a close the survey of the coast of Inverness-shire.

Ireland.—On the east coast of Ireland Mr. Hoskyn has been engaged on the upper part of Lough Strangford and on the coast of Down, and has sounded over an area of 65 miles. On the south coast Commander Edye has filled up the off-shore soundings that were wanting in our charts over an area of 1200 square miles; he has also sounded an area of 800 miles on the north coast. A general chart of the west coast of Ireland, on the scale of two-tenths of an inch to a mile, with numerous small plans, has been published by the Admiralty during the past year; as also Dingle and Ventry harbours and Blasket Sound, and the outlying fishing-bank and almost inaccessible islet of Rockall.

Mediterranean.—While carefully sounding the bottom and pioneering the way for the electric submarine cable between Malta and Alexandria, Captain Spratt, with his staff, in the *Medina*, has taken

advantage of the opportunity afforded to re-examine the north coast of Africa by Cyrenaica, and to correct its outline; also to make plans of the roadsteads of Tripoli, Benghazi, &c. One of the first uses to which the submarine telegraph was put was to determine the meridian distance between Malta and Alexandria. This has been successfully accomplished by Captains Spratt and Mansell; and the result of these measurements gives $16^{\circ} 6' 3''$ as the difference, or $29^{\circ} 51' 42''$ as the longitude of the lighthouse at Alexandria; this determination differs only $14''$ from that already obtained by chronometric measurements. On the coast of Syria Commander Mansell and his staff have completed a second sheet of the coast from Markab to Cape Bianco, and connected with it several important points in the interior, as Ba'albek, Hermon, Jibbel, Sunnin, and others.

The charts connected with the Mediterranean which have been published during the past year are as follows:—Valetta Harbour, Malta, on the scale of 11 inches to a mile; Rhodes Island, on the scale of eight-tenths of an inch, with enlarged plans of the ports; Scarpanto and Casso islands, on the scale of 1 inch; the western portion of Crete, on the scale of half an inch, with views and plans of ports, completing the survey of this rich and beautiful island; Euripo Strait, in Greece, on the scale of 3 inches; and a general chart of the Delta of the Danube, on half an inch, with the Sulina mouth of that river, showing the increased depth that has been gained over the bar by the recent works which have been carried out by the International Commission.

Africa.—On the west coast of Africa the river Volta has been explored as far as the first rapids at about 50 miles from its mouth, the Ogún for 40 miles from Lagos to within 4 miles of Abeokúta, and the St. Nicholas and Brass branches for 25 miles from the sea; and the sketch-map of each has been published at the Admiralty. In the Cape Colony Mr. Francis Skead, R.N., is engaged on the coast near Hout Bay. In the early part of the year he accompanied Mr. May, R.N., in Dr. Livingstone's new steamer to the Zambesi, made an improved sketch of the five mouths of that river, and more correctly determined their position, while Mr. May proceeded with Dr. Livingstone and Bishop Mackenzie to the river Rovúma, and explored it for 30 miles from its mouth, which was as far as the falling water would allow them to ascend: the sketch of this river, on the scale of 1 inch to a mile, has been published. In the Red Sea a plan of Dissee Island and harbour, and Commander Mansell's re-survey of the Strait of Jubal, with the Ashrafi Rqef and islet, have

been engraved; and it is gratifying to be enabled to add that the intelligent Viceroy of Egypt, His Highness Said Pasha, has caused three lights to be established to facilitate the navigation of that narrow sea—one on Zafarana Point, already lighted; one on the Ashraffi Reef, at the southern entrance of the Gulf of Suez, which will be lighted shortly; and a third on the Dædalus Reef, which is to be lighted towards the close of the year.

Asia.—The chart of the Persian Gulf, to which I referred last year, by Commander Constable and Lieutenant Stiffe, of Her Majesty's Indian Navy, has been published at the Admiralty in two sheets, on the scale of a quarter of an inch to a mile, with plans of several small ports and various views of headlands: it is accompanied by a memorandum on the former charts of this gulf, with a table of positions; and the Sailing Directions are far advanced in printing. The whole work is highly creditable to the surveying officers of the Indian Navy; and the chart is one of those selected to be sent as a specimen to the International Exhibition. A plan of Bahrein has also been completed by Lieutenant Whish.

In India a gap in the Malabar coast—Thullknob to Borin pagoda—has recently been filled up by Lieut. Williams, R.N.; and thus the whole of the west coast of the peninsula south of Bombay has been surveyed. Lieut. Taylor, R.N., is engaged in writing the Sailing Directions from Cape Comorin to the entrance of the Persian Gulf; while Lieut. Ward is making progress with those on the south coast of Arabia from Ras al Had to Bab el Mandeb, including Sokotra and the Gulf of Aden. There still remain some portions of this eastern region which it would be highly desirable to examine; and it is understood that the Secretary of State for India in Council has decided that the work shall be done; and I believe that it may help to advance the cause of geography by giving a brief summary of these gaps, coupled with the expression of the wish of the Geographical Society that an early opportunity may offer for their being filled up. They are as follows:—1. The coast of Malacca from the Sakshan River to Pulo Penang, about 300 miles. 2. Coast of Orissa from Santapilly Rocks to Point Palmyras, about the same distance. 3. The coast from Chittagong to Akyab, at the head of the Bay of Bengal. 4. The re-examination of the group of the Andaman Isles. 5. The west coast of India from Bombay northwards to Danú, about 100 miles. 6. Bombay Harbour on a large scale, so as to admit of docks and other engineering works being planned upon it. 7. The Batnah coast from Maskat to the

entrance of the Persian Gulf, 250 miles. 8. The coast of Africa from Ras Bir to the entrance of the Red Sea, 15 miles. 9. A series of chronometric measurements throughout the Bay of Bengal and to Singapore. 10. A similar series from Bombay westwards to Suez and to the outlying islands in the Indian Ocean.

These two last can only be well done by a vessel specially devoted to the service, carrying a batch of at least thirteen chronometers. There is no work that could be undertaken that would place the hydrography of those seas on a firmer basis than the measurements last named; and I believe that I do but give utterance to the hearty desire of this Society in expressing a wish that, before the accomplished surveyors of the Indian Navy are dispersed abroad, Her Majesty's Secretary of State for India, than whom no one knows better the value of accurate geographical information, may be pleased to set this seal to the labours of Ross, Horsburgh, Moresby, Elwon, Grieve, Haines, Ethersey, and other officers of the Indian Navy, who, during the past half-century, have patiently borne the toil and heat of the day to furnish the mariner with charts by which he may with safety navigate those Eastern seas.

In the Banka and Gaspar Straits, and near Linga, Mr. Stanton, R.N., in H.M.S. *Saracen*, has materially corrected our charts during the past year. It may serve to show our ignorance of the geography of these regions in the middle of the nineteenth century, when I state that the populous town of Palambang, in Sumatra, was found to be 14 miles in error in latitude in all our best maps and charts, being placed that much too far to the south. A chart of Singapore, by Mr. John Richards, R.N., has recently been published by the Admiralty on the scale of 12 inches to a mile; it shows at a glance the docks, coal-wharfs, and other accommodation at that flourishing entrepôt of the trade of the East.

China and Japan.—One hundred and twenty miles of the upper part of the Yang-tze-Kiang above Han-kow have been explored as far as Yo-chow-foo, at the entrance of the Tung-ting Lake, about 500 miles above Nan-king, during the past year. In addition to this service, Captain Ward in the *Actæon*, and Lieut. Bullock in the *Dove*, have been employed on the southern coast of Japan. In the mean time some of the results of their labours of former years have recently been published by the Admiralty—as Port Adams in the Gulf of Pe-chi-li; the Lian River up to Niu-chwang, one of the trading ports under the treaty; Chi-fu or Yen-tai harbour; Talién-whan Bay, Wei-hai-wei and Lung-mun harbours; Hai-yun Island, containing

Thornton Haven, Pe-chi-li Strait, and a general chart of the Gulfs of Pe-chi-li and Liau-tung. The *Actæon* has just arrived in England, after five years' absence in the China Seas, during which very material additions have been made by her officers and crew to our knowledge of the coast, rivers, and outlying islands of China and Japan.

Australia.—Allusion was made in the Address from the Chair of last year to the wise liberality of the Australian colonies in sharing with the Admiralty the expenses of an organised system of coast surveys. Parties, under the command, respectively, of Commanders Sidney, Cox, Hutchison, Lieut. Brooker, and Mr. J. Jeffreys of the Royal Navy, are now established in New South Wales, Victoria, South Australia, Tasmania, and Queensland; detailed plans of places locally important have been received, and the steady progress of an efficient examination of the extensive lines of seaboard of the several provinces may now be confidently anticipated.

To keep pace with the rapid extension of colonization on the shores of the intertropical part of the east coast, a series of charts to connect with the detailed surveys of the late Captains Owen Stanley and Blackwood (which extended from Torres Strait to $18\frac{1}{2}^{\circ}$ south), are in the course of construction, compiled from the detached and partial examinations of our naval surveyors from the time of Cook to the present date, to be eventually connected, it is to be hoped, by the rising generation.

Charts of the Coral Sea, embracing on a small scale all these coast features, and giving the recent surveys of Captain Denham, R.N., have been published, and prove a great boon to the navigator. The labours of this officer in the Australian seas, extending over nine years' service, deserve more than a passing notice; but, limited necessarily in this Address in time and space, a summary of the more salient statistical features can alone be given. 200 sheets, as I am informed, of charts, plans, and drawings, are completed and in progress; 163 positions catalogued; the variation of the compass tested afloat 2410 times, and 191 times on shore; 41 islands and 42 ocean reefs and sunken shoals surveyed; 700 miles of edge of soundings contoured; and 23 fabulous dangers erased from the charts.

The most favourable accounts have been received of the security of the passage through Torres Strait by the great north-east channel; and the testimony appears to be overwhelming in its favour compared with those by Raine Islet and the numerous treacherous openings through the barrier reefs near the 12th parallel of

south latitude. The merchant-ship *Castilian*, drawing 20 feet, has recently made two voyages through the north-east channel in sixteen hours. We cannot here forbear paying a passing tribute to the valued labours of the late Captain Francis Blackwood, R.N., who so successfully and clearly defined this remarkable and valuable channel.

A general chart of Australia in two sheets, with the adjacent islands and seas between its northern coast and the equator, has also been completed during the past year. The authorities and materials for this chart have been most extensive; in addition to the well-known names of Flinders, King, Wickham, Stokes, Stanley, Blackwood, Yule, and Denham, the recently-published Dutch charts of the Arafura, Banda, and Java seas have been consulted, and the northern coast of New Guinea, the shores of New Ireland and New Britain, as resulting from various French surveys extending over half a century, connected by the more recent chronometric measurements of Sir E. Belcher—the whole chart being thus reduced to the common meridian of Fort Macquarie, Sydney, New South Wales.

Vancouver Island.—Crossing the Pacific Ocean to the thriving colony of British Columbia, we find that Captain George Richards, in H.M.S. *Hecate*, with his staff of assistants, has surveyed 700 miles, much of it open sea-coast or the exposed entrances of the great sounds on the west side of Vancouver Island; during which time the party thoroughly sounded over an area of 400 square miles in Barclay and Clayoquot or Clakkot sounds, and more generally over 1400 miles off the entrance to Fuca Strait. In the course of the past year plans have been published at the Admiralty of Esquimalt and Victoria harbours, on the large scale of 10 inches to the mile; of Haro Strait and Middle Channel, on the scale of one inch; and Sailing Directions generally for the straits, harbours, and rivers of this district.

Newfoundland.—The re-examination of the south coast of Newfoundland, under Captain Orlebar and his assistants, has made good progress during the past season, in the course of which 200 miles of sea and harbour coast-line have been mapped in six large sheets, generally on the scale of 3 inches to a mile. At the same time, plans of Placentia Harbour, Port Basque, and St. Pierre Island, on the same scale, have been published, as well as Pope and Tangier harbours in Nova Scotia—the latter place becoming of importance on account of the immediate vicinity of the gold-diggings which have been discovered.

Bay of Fundy.—The tedious survey of this bay of fogs and rapid tides is at length complete, and Captain Shortland and his staff have moved on to the south-eastern part of the coast of Nova Scotia. In the course of the past season they have mapped 27 miles of open coast and 154 miles of harbour and river shore-line, sounding over an area of 260 square miles. On this eastern coast of America the unhappy civil war, and the uncertain state of political affairs, has led to the publication of forty-two sheets of the several charts and plans taken from the admirable United States Coast Survey, with the Sailing Directions that accompany them.

West Indies.—The survey of the group of the Grenadines has been completed by Mr. Parsons, R.N., and his assistants, and they are now moving on to the island of Sta. Lucia and the port of Castries. In the course of the year they have mapped 45 miles of coast-line, and sounded over an area of 310 square miles. The chart of Grenada, on the scale of one inch, and the plan of St. George Harbour, on the scale of 20 inches, have been published. Also, in Texas, plans of the entrances of Rio Grande and Brazos River, with the San Luis, Aransas, and Sabine passes.

Variation of the Compass.—Resulting from the investigations that have been in progress for some time past (which have been alluded to in former Addresses) by Mr. Frederick J. Evans, R.N., F.R.G.S., Superintendent of the Compass Department of the Admiralty, and Mr. Archibald Smith, whose gratuitous labours in this cause are beyond all praise, a Manual embracing ample practical and theoretical rules for ascertaining and applying the deviation of the compass in ships is on the eve of publication. This Manual has appended to it charts of the lines of equal variation, dip, and horizontal force, by the examination of which the seaman may become familiar with the distribution of these elements, so important as a correlative branch of science to that of navigation under the great impending changes in naval architecture. It is a gratifying feature that these researches should have preceded the sudden demand for a new order of iron war-ships. In connexion with this subject, Mr. Burdwood, R.N., of the Hydrographic Office, has computed and published Tables of the sun's true bearing or azimuth for the parallels of 49° and 50° N., which will enable the mariner at once to determine the amount of variation and local deviation combined by a simple compass-bearing of the sun either in the morning or the evening—thus affording a constant check to the ever-changing deviation in an iron ship, according to whether she heels to star-

board or port, which in many cases is an unsuspected source of danger.

Besides the surveys above enumerated as in progress in different parts of the world, the labours of the Hydrographic Office during the past year have consisted in the publication, under the immediate superintendence of Captain George A. Bedford, R.N., Assistant Hydrographer, of about ninety new and corrected charts and plans, some of which I have already mentioned. There have also been published the usual Tide Tables for two thousand places on the face of the globe, Light and Hydrographic Notices acquainting the mariner at once with the slightest change or discovery of rock or shoal that can affect the safety of navigation. Mr. Michael Walker, too, has taken advantage of the leisure afforded by his retirement from office, and has examined and corrected about five hundred of the Maritime Positions, chiefly in the Eastern seas, recently published in the 7th edition of Raper's 'Practice of Navigation.'

ORDNANCE SURVEY.*

The publication of 'The Trigonometrical Survey of the United Kingdom' is now completed, and is comprised in seven quarto volumes, viz. :—

- I. The Principal Triangulation, with the Figure, Dimensions, and Mean Specific Gravity of the Earth derived therefrom, 2 vols.
- II. Levelling, taken in Ireland, 1 vol.
- III. Levelling, taken in England and Wales, 2 vols.
- IV. Levelling, taken in Scotland, 2 vols.

Thus this great work, which was commenced in 1783, under General Roy, R.E., is at length finished.

In last year's estimates the sum of 1000*l.* was taken to enable the director of the survey to extend the triangulation of England through France to the frontiers of Belgium, so as to form a connection between the triangulations of England and Belgium. This operation has been completed. The stations selected to form the connexion across the Channel were St. Peter's Church, between Margate and Ramsgate; Coldham, on the high ground north of Folkestone; and Fairlight, a few miles north of Hastings. From these three stations observations were taken to the church at Gravelines, to Mont Couple, near Wissant, and Mont Lambert, near Boulogne.

* Colonel Sir Henry James, R.E., Superintendent of the Ordnance Survey.

From these three last-named stations a station raised 74 feet above the level of the ground at Harlettes, between Boulogne and St. Omer, was observed, and then the churches at Cassel and Dunkirk, and then the station at Mont Kemmel, near Ypres, in Belgium. The triangle, Dunkirk, Cassel, and Mont Kemmel, is common to the triangulations of France and Belgium, and is now also made part of the extended triangulation of this country, and the lengths of its sides will therefore be independently determined by the geometricians of the three countries from the measured bases in the three countries, and a comparison of the results will be highly interesting; but the French officers who were ordered to observe at the same stations that ours observed at, not having been able last year to take the observations across the Channel, the comparison cannot yet be made. They have now, however, returned to this country to recommence their work, and it is to be hoped they will be able to finish it this summer.

During last year the Belgian geometricians were engaged in connecting their triangulation with that of Prussia, and the Prussians in connecting theirs with that of Russia; and thus we shall shortly have a connected triangulation, extending from the west of Ireland to the Oural Mountains, and the means of computing the length of an arc of parallel of about 75° in length.

The electric telegraph now furnishes the means by which the difference of longitude between distant places can be determined with greater precision than they could formerly be by the transmission of chronometers from one station to another.

The Astronomer Royal will therefore this year re-determine the difference of longitude between Valentia, in the s.w. of Ireland, and the observatory at Greenwich, by means of the electric telegraph; and as it will be necessary for the director of the survey to connect the station selected by the Astronomer Royal at Valentia with the triangulation of the kingdom, a joint expedition is now about to proceed to Valentia for this double purpose, and to complete the quota of work assigned to us for the measurement of this great arc of parallel.

The engraving of the complete map of Ireland in outline, on the scale of one inch to a mile, was finished last year, and the hill features are now being engraved. There are 205 sheets in this map.

The progress of the Cadastral Survey in the north of England and Scotland has been greatly retarded in consequence of the very numerous and extensive surveys which have been made by the

Ordnance in the south of England for purposes connected with the defences of the kingdom.

But as all these have been made on the scales adopted for the National Survey, and the plans have been drawn as so many sheets of a complete survey of the counties to which the places belong, they will form a part of the Cadastral Survey of England and Wales, should such a measure be decided on; and as the committee of the House of Commons, of which Lord Bury was chairman, which was appointed last year to report upon "the expediency of extending the Cadastral Survey to those portions of the United Kingdom which have been surveyed upon the scale of one inch to a mile only," have reported in favour of it, the cost of the surveys made for the defences will go to diminish the cost of the Cadastral Survey.

In the north of England, Yorkshire and Lancashire have been published on the 6-inch scale; Westmoreland and Durham on the 25-inch scale; and the survey is in progress in Northumberland and Cumberland. A large portion of each of these counties has already been published, and they will be finished this year. The last sheets of the 1-inch map of England and Wales are in the hands of the engravers; we may, therefore, expect that this map, which was begun in 1784, will now be soon finished. In Scotland all the southern counties have been published either on the 25-inch or 6-inch scales; and the counties of Forfar, Perth, Stirling, and Dumbarton are in course of publication; and the survey is proceeding in Perthshire, Kincardineshire, and Buteshire. The one-inch map of Scotland is also in course of publication.

The plans of the eight northern counties of Ireland have been revised and made perfect in every detail, like the plans of the southern counties. This perfect revision was rendered necessary to enable the Government valuers to mark upon the plans every property and tenement; and this has now been done throughout the whole of Ireland. The Ordnance plans are now invariably used for the transfer of land under the Landed Estates Court, the cost of preparing the plans for the court being charged to the carriage of the sale of the property; and the same arrangement will doubtless be introduced here as soon as some progress is made in the Cadastral Survey.

Sir Henry James has this year published six sheets of the Marginal Lines for the sheets of a map of the whole world, on the scale of 2 inches to a mile; the object in view being to have a map constructed on the largest scale required for geographical purposes, the

sheets of which can be put together to form a connected map of any part of the world, however large or however small; and to avoid the confusion arising when we attempt to put together maps of different countries, as they are now constructed on different scales and on different projections.

This is a great undertaking, and one which will require the co-operation of a great number of people and some years to accomplish; but the advantages to be derived from having such a grand map of the world are obvious; and it is right that the topographical department of such a country as ours should undertake to make it.

In a discussion upon the relative merits of several projections for large portions of the earth's surface which has been published in the last number of the '*Philosophical Magazine*,' it has been demonstrated, that, assuming the errors which all projections of a spherical surface on a plane must necessarily have, viz., distortion in form and distortion in area, are equally objectionable, the distance of the point of projection adopted by Sir Henry James in his geometrical projection of two-thirds of the sphere, will, for the projection of a hemisphere, give the least possible distortion of form and area, and that the misrepresentation will be a minimum. If we draw a circle and two diameters in it at right angles to each other, one may be taken to represent the plane of projection for the concave hemisphere above it, and the point of sight or projection is at the distance of half the radius in the prolongation of the other beyond its circle. It is now demonstrated that this is the best possible projection for a hemisphere, and it should therefore be adopted by all geographers.

METEOROLOGY.*

In Meteorology some degree of increased interest has been caused by various discussions and publications, besides an organised system of forecasting weather and giving cautionary notice of expected storms.

In treating so complicated and extensive a subject as that of our atmosphere and its movements, it is extremely difficult to combine mathematical exactness with the results of experience obtained by practical ocular observation and much reflection; but to some extent this has been effected recently, the Board of Trade having arranged telegraphic and frequent communication between widely-separated

* Admiral FitzRoy, Director of the Meteorological Department, Board of Trade.

stations and a central office in London; by which a means of *feeling*—indeed one may say *mentally seeing*—successive simultaneous states of the atmosphere over the greater extent of our islands is established; and an insight into its dynamical laws has been thus obtained, to which each passing month has added elucidation and value.

Possibly at this time, when extensions of our arrangements to the Continent are contemplated in France, in Hanover, and in Prussia (although *here* there are still persons who doubt, if they do not entirely disbelieve their utility), it may be desirable to circulate an explicit description of the basis, and the nature, of those forecasts and occasional warnings, which have been proved during the past year.

The first cautionary or storm-warning signals were made in February, 1861; since which time similar warnings have been given, as occasions needed.

In August, 1861, the first published “forecasts” of weather were tried; and after another half-year had elapsed for gaining experience by varied tentative arrangements, the present system was established. Twenty reports are now received each morning (except Sundays), and ten each afternoon, besides five from the Continent. Double forecasts (two days in advance) are published, with the full tables (on which they chiefly depend), and are sent to six daily papers, to one weekly, to Lloyds’, to the Admiralty, and to the Horse Guards, besides the Board of Trade.

These forecasts add almost nothing to the pecuniary expense of the system, while their usefulness practically is said to be more and more recognised.* Warnings of storms arise out of them, and (scarcely enough considered) the satisfaction of knowing that no very bad weather is imminent may be very great to a person about to cross the sea. Thus their negative evidence may be actually little less valuable than the positive.

Prophecies or predictions they are not: the term forecast is strictly applicable to such an *opinion* as is the result of a scientific combination and calculation, liable to be occasionally, though rarely, marred by an unexpected “downrush” † of southerly wind, or by a rapid

* At a recent meeting of the Shareholders of the Great Western Docks at Stonehouse, Plymouth, it was stated officially that “the deficiency (in revenue) is to be attributed chiefly to the absence of vessels requiring the use of the graving-docks for the purpose of repairing the damages occasioned by storms and casualties at sea.”

† Herschel.

electrical action not yet sufficiently indicated to our extremely limited sight and feeling. We shall know more and more by degrees. At present it is satisfactory to know that the measures practised daily in these proceedings do not depend solely on one individual: they are the results of facts exactly recorded, and deductions from their consideration, for which rules have been given. An assistant is able to share their responsibility now, and others are advancing in the subject of dynamical meteorology.

In order to enable the reader to judge of the basis on which rules for forecasting probable weather are founded, some degree of explanation may here be offered—as the method is new in its combinations, although depending on old or well-known principles.

Air-currents sometimes flow side by side, though in opposite directions, as “parallel streams,” for hundreds or even thousands of miles. Sometimes they are more or less superposed: occasionally, indeed frequently, crossing at various angles; sometimes combining, and by the composition of their forces and qualities causing those varieties of weather that are experienced as the wind veers more toward or from the equator or the nearest pole; and sometimes so antagonistic in their angular collision as to cause those large circular eddies or rotatory storms, called cyclones, which are really like the greater storms in all parts of the world, although they do not quite assimilate to local whirlwinds, dust-storms, and other commotions of atmosphere, which seem to be more electrical in their characteristics, if not in their origin.

Whenever a polar current prevails at any place, or is *approaching*, the air becomes heavier, and the barometer high, or rising. When the opposite (equatorial or tropical) prevails or approaches, the mercury is low or falls, because the air is, or is becoming, specifically lighter, and these changes take place slowly. Whenever, from any causes—electrical, chemical, or simply mechanical—either current, or any combination of currents, ceases to press onwards without being opposed, a gradual lightening of the atmosphere, through a greater or less area of hundreds or perhaps thousands of miles occurs, not suddenly, but very gradually, and the barometer falls: there is less tension.

To restore equilibrium, the nearest *disposable* body of air (so to speak), or most moveable, advances first; but an impulse at the same time may be given to other and greater masses that—though later in arriving—may be stronger, last longer, and cause greater

pressure, mechanically as well as by combination. Air, like water, mingles slowly, either from above or laterally.

Taking, with Dové, north-east and south-west (true) as the "wind-poles," all intermediate directions are found to be more or less assimilated to the characteristics of those extremes, as they are nearer one or other; while all the variations of pressure or tension, many of those caused by temperature, and all varieties of winds, may be clearly and directly traced to the operations of two constant principal currents—equatorial or tropical, and polar—our north-east and south-west.

It has been proved that storms—indeed all the greater circulations of atmosphere in the zone between the tropics and polar regions—have an eastward motion bodily, while circulating around a central area. Within the tropics it is otherwise, or westward,—till they *recurve*, moving first toward the *nearer* pole, direct, and then eastward, with more or less direction toward the same pole.

Clear distinction should be made between those ever alternate and often conflicting main currents—tropical or polar, and the local effects of their union or antagonism, namely, mixed winds—whether westerly or easterly, with occasional eddies, or cyclones, on a larger or on a smaller scale.

The lower current does not ordinarily extend far upward (only some few thousand yards), and highlands, mountains, especially *ranges* of mountains, alter and impede its progress, so that a variety of eddy winds, or streams of wind, with local and apparently anomalous effects, are frequently caused.

Heat, electrical action, or cold; condensation of vapour into hail, snow, rain, or fog; or its other changes, namely, evaporation, rarefaction, and expansion—absorbing heat, and therefore causing *cold*—immediately cause currents of air, in a degree proportional to such influence; inducing horizontal motion and dynamical force.

The polar current always *advances* from the polar quarter while *laterally* moving eastward (like a ship making lee-way), being pressed towards the east by the tropical flow which advances from the south-westward, usually above and at an angle with the polar stream or current of air, often mixing with it, but at times *separately* penetrating downward, then sweeping and warming the earth's surface, uncombined with the polar current even while feeling its approaching influence, and thus, as it were, forcing passages between streams of chilling polar air that at the same time are moving in opposite and nearly parallel directions.

At times, after a continuance of tropical air-current, or during its general prevalence, a polar flow or separate stream of air (electric, cold, dry, and of greater pressure or tension than the prevailing body of air then next the earth) passes above, chilling and otherwise influencing the lower air through which, at some places, it penetrates completely.

These movements of air-currents are shown by clouds crossing the heavenly bodies, by the visible characteristics of those clouds, and by simultaneous observations of temperature, tension, force of wind, and its true direction, at many places.

It is very interesting as well as practically useful to mark how these inroads or mixtures of air-currents occur, and to note their beginnings or endings at a few places considerably separated; such, for instance, as Copenhagen and Lisbon, Galway and Heligoland, Jersey and Aberdeen, Queenstown (or Valentia) and Berwick or Yarmouth, with intermediate places. But this special feature may be better referred to after a few other considerations have been submitted as preliminary.

Dynamical force, pressure of air in motion, is generated by disturbed equilibrium, whether electrically by heat or cold, mechanically by aqueous expansion into gas, by contraction into rain, snow, or ice, or by previously induced action of air-currents among themselves, with their inertia.

Hence it follows that no great disturbance of equable temperature, tension, dryness, or moisture, can occur without a proportionate dynamical force, tending to cause currents of air, or wind, however resisted, deflected, or otherwise affected by similar and simultaneous actions, more or less in opposition or in combination.

Sometimes their opposition is so equal, and equilibrium is so complete, that a calm is the result, no sensible movement horizontally along the earth's surface being perceptible.

Frequently combination occurs, and dynamical effects are produced in proportion. These are particularly evident in the meetings of tropical and polar winds (by the west), by their subsequent continuance in strength as mixed winds, and by the concurrence or combination of cyclones.

Successive, or rather consecutive, gyrations, circuits, or cyclones, often affect one another, acting as temporary mutual checks, until a combination and joint action occurs; their union causing then much greater effects, as may be seen even in water-currents as well as in the atmosphere itself.

Between the tropics and the polar regions, or in temperate zones, the main currents are incessantly active, while more or less antagonistic, from the causes above mentioned; besides which, wherever considerable changes of temperature, development of electricity, heavy rain, or these in combination, cause temporary disturbance of atmospheric equilibrium (or a much altered tension of air), those grand agents of nature, the two great currents, speedily move by the *least resisting lines* to restore equilibrium, or fill the comparative void. One current arrives, probably, or acts, sooner than the other; but invariably collision occurs of some kind or degree, usually occasioning a circuit, a cyclonic (or ellipsonic) gyration, however little noticed when gentle or moderate in force.

As there must be resistance to moving air (or a conflict of currents) to cause gyration, and as there are no such causes on a large scale near the equator, there are no storms (except local squalls) in very low latitudes.

It is at some distance, from about 5° to 20° , from the equator that hurricanes are occasionally felt in their violence. They originate in or near those hot and densely-clouded spaces, sometimes spoken of as the "*cloud-ring*," where aggregated aqueous vapour is at times condensed into heavy rain (partly with vivid electrical action), and a comparative vacuum is suddenly caused, towards which air rushes from all sides. That which arrives from a higher latitude has a westwardly, that from a lower an eastwardly, tendency, due to the earth's rotation and to the change of latitude, whence a chief cause of the cyclone's invariable rotation in one direction, as above explained.

The hurricane, or cyclone, is impelled to the west in low latitudes, because the tendency of both currents there is to the westward along the surface, although one—the tropical—is much less so, and becomes actually easterly near the tropic, after which its equatorial centrifugal force is more and more evident, while the westwardly tendency of the polar current diminishes; and, therefore, at that latitude hurricane cyclones cease to move westward (recurve), go then easterly, and on toward the polar quarter.

Great and important changes of weather and wind are preceded as well as accompanied, by notable alterations in the state of the atmosphere.

Such changes, being indicated at some places sooner than at others around the British islands, give frequent premonitions; and therefore great differences of pressure (or tension) shown by barometer, of

temperature, of dryness or moisture, and direction of wind, should be considered as *signs of changes likely to occur soon*.

It will be observed, on any continued comparison of weather reports, that during the stronger winds a far greater degree of uniformity and regularity is shown than during the prevalence of moderate or light breezes; and this should be remembered in forecasting weather.

When neither of the greater and more extensive atmospheric currents is sweeping across the British islands (currents of which the causes are remote, and on a large scale), the nature or character of our winds approaches, and is rather like that of land and sea breezes in low latitudes, especially in summer.

Either the cooler sea-wind is drawn in over land heated by the summer sun, or cold air from frosty heights, snow-covered land, or chilly valleys, moves towards the sea, which is so uniform in temperature for many weeks together, changing so slowly and but little, in comparison with land, during the year. These light variables may at such times be numerous, simultaneously, around the compass on the various coasts of the British islands.

Frequently it has been asked, "In this country, how much rise or fall of the glasses may foretell remarkable change or a dangerous storm?" To which can now be replied, "Great changes or storms are usually shown by falls of barometer exceeding half an inch, and by differences of temperature exceeding about fifteen degrees. Nearly a tenth of an inch an hour is a fall presaging a storm or very heavy rain. The more rapidly such changes occur, the more risk there is of dangerous atmospheric commotion."

As all barometric instruments often, if not usually, show what may be expected, a day or even days in advance, rather than the weather of the present or next few hours; and as wind, or its direction, affects them much more than rain or snow, due allowance should always be made for days as well as for hours to come.

The general effect of storms is felt unequally in these islands, and less inland than on our coasts. Wind is diminished or checked by its passage over land. The mountain ranges of Wales or Scotland, rising two to four thousand feet above the ocean level, have great power to alter the direction and probably the velocity of wind, independently of alterations caused by changes of temperature at elevations.

Extensive changes, showing differences of pressure above or below the normal or mean level, amounting to nearly an inch, or

thereabouts, are certain to be followed by a marked commotion of the elements in the course of a few days. If the fall has been sudden, or the rise very rapid, swift but brief will be the resulting elementary movement; if slow or gradual, time will elapse before the change, and the altered state of weather will take place more gradually, but last longer.

Notice may thus be obtained and given a few hours, or a day, or even some days, before any important change in the weather actually occurs.

Having such knowledge, it obviously follows that telegraphic warning may be sent in any direction reached by the wires; and that occasionally, on the occurrence of very ominous signs—barometric and other, including always those of the heavens—such cautions may be given before storms as will tend to diminish the risks and loss of life so frequent on our exposed and tempestuous shores. Barometers show the alterations in tension—or, so to speak, the pulsations, on a large scale—of atmosphere; and diagrams express to practised observers what the “indicator-card” of a steam-cylinder shows to a skilful engineer.

Our own islands have very peculiar facilities for meteorological communication by telegraph between outlying stations on the sea-coast and a central place, all being at nearly the same level, and nearly all comparatively uninfluenced by mountain ranges.

And now the results are, that, having daily knowledge of the weather (including ordinary facts of a meteorological nature) at the extreme limits and centre of our British islands, we are warned of any great change taking place; the greater atmospherical changes being measured by days rather than by hours. Only local changes, however violent they may be occasionally (and dangerous in proportion to their suddenness and violence), only those changes are unfelt at a distance, and do not influence great breadths—such as hundreds of miles area of atmosphere—horizontally.

Some special, and to many persons entirely new, considerations should here be mentioned, as they are now practically valuable in connection with forecasting weather.

When opposing currents of air meet, their masses must continue in motion a certain time, either rotating, or ascending, or going onward horizontally in combination.

Masses of air, either of polar or tropical origin, so to speak, returning (when driven back by stronger opposition), at first, and

for a certain time, retain the characteristics of their peculiar and very different natures.

In our latitudes there is a continuous alternation of air-currents, each specifically different, and denoting approach by marked characteristics; and we have proved, by successive series of simultaneous statical observations over a wide range—embracing Scotland, Ireland, all England, and adjacent islands—that, while these alternating or circuitously-moving currents are thus incessantly passing, the whole body of atmosphere, filling our temperate zone, is moving gradually *towards the east*, at an average rate of about 5 geographical miles an hour (from 2 to 8 miles).

During strong westerly winds this eastward motion is greatly increased, and in easterly gales it is proportionately diminished, as measured by its passage along a horizontal surface of earth or ocean.

Knowing these circumstances, and having accurate statical observations of these various currents at selected outlying stations, showing pressure (or tension), temperature, and relative dryness, with the direction and estimated horizontal force of wind at *each place simultaneously*, the dynamical consequences are already measurable approximately on geometrical principles; and, judging by the past, there appears to be reasonable ground for expectation that meteorological dynamics will be soon subjected to mathematical analysis and accurate formulas. The facts now weighed and measured mentally—in what may be correctly called forecasting weather—are the direction and force of air-currents or wind, reported telegraphically to the central station in London from many distant stations, their respective tension and temperature, moisture or dryness, and their changes since former recent observations. These show whether any or either movement or change is on the increase or decrease; whether a polar current is moving laterally off, passing from our stations towards Europe, or approaching us from the Atlantic; whether moving direct towards the south-westward with great velocity, or with slow progress. If moving fast in the direction of its length, it will approach England more from the east—its speed direct being 20 to 50 or 80 miles an hour; while its constant lateral or easterly tendency (like a ship's leeway in a current), being only 5 miles an hour, is then insensible to us (though clearly deducible from other facts ascertained), and is that much in alteration of actual direction, as well as of what would otherwise be the velocity of that polar current.

With the opposite principal current—the equatorial or south-westerly, more briefly and correctly, tropical—similar but opposite results occur. The direct motion from a south-westerly quarter is accelerated sensibly to our perception by part of the eastward constant (about 5 miles hourly), and therefore a body of air approaches us sooner (other things being equal) from the westward than it does from the eastward.

To seamen accustomed to navigate in ships making leeway while in currents setting variously over the ground, such movements, complicated as they may appear, are familiar. There are the ship's headway, leeway, and drift to be considered, in combination with the motion or current-rate of the buoyant water, and that perhaps an upper current, differing from one beneath, while each is passing across the bottom or bed of the sea beneath all.

But the motes circling in a beam of light across a draught of dusty air may perhaps show what is meant by such combined and varying motions of fluid, elastic, and mobile air, as are here mentioned.

One important consideration is the disposal or progress of bodies of air united, or mixed, or contiguous to each other, after their meeting—either directly opposed or at an angle—on the earth's (or ocean's) surface. They do not vanish. They cannot go directly upwards, against gravitation; westward they cannot (generally) go when there is collision or meeting, because the momentum, elasticity, and extent of the tropical "antitrade,"* or south-wester, usually overpowers any direct polar current, or rises over it and more or less affects the subordinate one below by the friction of its eastward pressure. Downward there is no exit; eastwardly (towards the east) the accumulating air must go, and this tendency continued causes the varieties of wind from the westward; being more or less mixed, more or less purely polar or tropical, as either one prevails in combination.

After a body of air has passed and gone to some distance southward or northward, it may be stopped by an advancing and more powerful mass of atmosphere, which is moving in a direction contrary to or diagonally across its line of force. If their appulse be gradual and gentle, only a check occurs, and the weaker body is pushed back until its special qualities, respecting temperature and

* Sir John Herschel's excellent term.

moisture, are so masked by those of its opponent as to be almost obliterated; but if these currents meet with energy at very different temperatures and tensions, rapid changes are noticed as the wind shifts, and circuitous eddies, storms, or cyclones occur.

Otherwise, when their meeting is, as first mentioned, gradual, there is the return of a portion of either current (which previously prevailed), either direct or deflected—deflected even through more than one quadrant of a circle—by its advancing opponent, and retaining for some considerable time its own previous characteristics. Thus we have for short times cold, dry winds from the south-west, instead of the usual warm and moist ones; or winds of the latter kind from the north, instead of cold ones.

The circuitous tendency of air in motion, and the numerous impediments to its horizontal progress, such as land, ranges of mountains, hills, or even cliffs, induce many a deviation from normal directions, extremely puzzling to the student of this subject; but so retentive is air of its tension and temperature for a time, that, like currents in the ocean, each may be traced by its characteristics as long as within our insular web of stations.

When the polar current is driven back by a tropical advancing from a southerly direction gradually, their action united becomes south-easterly (from the south-eastward); and as the one or other prevails, the wind blows more from one side of east or from the other. Time is required to produce motion in the air—horizontally—and more time is indispensable for its gradual cessation from movement.

Statical effects are noticed at observatories, or by careful observers anywhere, some hours or days before notable dynamical consequences occur.

When a body of atmosphere is moving from or towards the pole, its impelling force (*vis a tergo*) may cease; while the mass itself has a certain impetus or momentum.

Diminishing tension then results at the place of checked energy, and the upper current (always present) descends. At the same time there is an alteration of tension at the farther extreme, which is meeting and mingling with, if not resisting, checked, and deflected by the advancing opponent.

Consequent on this an extent of air, reaching, perhaps, across some hundred miles, becomes, as it were, isolated. Detached from its original source and maintenance, whether polar or tropical, and then quite surrounded by air of a different character, it is impelled

in new and varying directions, still retaining for a time more or less of its characteristics, until altered entirely, and totally incorporated with its conqueror.

Hence we sometimes have cold tropical wind, with electrical and other polar characteristics (for a limited time only), before the tropical predominates; or, on the other hand, a warm polar air-current, with tropical peculiarities.

Moreover, in addition to these causes of apparent inconsistency or irregularity are the results of circling currents—streams of air retaining their features, although changed, it may be even totally, in direction along the earth's surface; besides a variety of merely local alterations, such as are effected by high lands, or valleys, or coast-lines. All these, and many other minor considerations, ought to be familiar and present to a forecaster of weather, who would judge comprehensively according to observed facts and ascertained laws.

Lunarists and Astro-meteorologists support theories which, if in accordance with facts, would affect our whole atmosphere, or a hemisphere, or at least an entire zone, in a similar way, on account of the (supposed) influencing causes acting over all the rotating earth, and not only over Europe, or its adjacent islands.

At the Board of Trade from thirty to forty weather-telegrams are received daily (except Sundays), and the present forecasts, or premonitions of weather, are drawn up on the following arrangement. Districts are thus assumed:—

1. Scotland.
2. Ireland, around the coasts.
3. West Central (Severn to the Solway), coastwise.
4. South-West England (from the Severn to Southampton), by the coast.
5. South-East England (Wight to Thames).
6. East Coast (Thames to Tweed).

As newspaper space is very limited, and as some words are used in different senses by various persons, extreme care is taken in selecting those for such brief, general, and yet sufficiently definite sentences as will suit the purposes satisfactorily.

Such words as are commonly found on published scales of force, or nature of wind and weather, are generally understood, and therefore are used in preference to others, however apparently expressive.

In saying on any day what the *probable* character of the weather

will be to-morrow, or the day after, at the foot of a table showing its observed nature that very morning, a limited degree of information is offered for about two days in advance, which is as far as may be trusted generally, on an average, though at times a longer premonition might be given with sufficient accuracy to be of occasional use.

Minute or special details, such as showers at particular places, or merely local squalls, are avoided; but the general or average characteristics, those expected to be principally prevalent (with but few exceptions) the following day and the next after it, including the nights (not those of the weather actually present), are cautiously expressed, after careful consideration. Ordinary variations of cloudiness, or clear sky, or rain, of a *local* or only temporary character, are not noticed usually.

That a broad *general average or prevalence* is kept in view, referring to a day or more in advance, and to a district, rather than only to one time or place, should be remembered by the reader.

The great practical difficulty is in separating the effect on the mind of present states of air, weather, and clouds, from abstract considerations of what may be expected on the morrow or next following day.

As meteorological instruments usually foretell important changes by at least a day, or much longer, we have to consider what wind and weather may be expected from the morning observations, compared with those of the days immediately previous, as indicative of the morrow's weather, and of the day after, at each place; to take an *average* of those *expectations* for each district collectively, in *groups*; and then to estimate the dynamical effects which may be anticipated as the legitimate consequences of such relative tensions, temperatures, and dryness, occasioning more or less inequality in the atmospheric equilibrium, and thus causing greater or less horizontal motions of air-currents, or ordinary winds.

Comparisons of the moist and dry thermometers are very useful, if well observed, in telling the hygrometric condition of air; and thence, with other facts, showing how either current prevails, or has relative influence—a point of much importance in forecasting a change of wind either way, as well as the probability of rainy or dry weather. A good electrometer is not yet available at our out-stations, however desirable such an instrument would be, in expressing, not only relative electrical states of air, but what, till a better term is offered, may, perhaps, be called the *polarity* of our atmosphere (if not its polarisation).

Whether there is a condition, or relative position of the particles of air, in a tropical current, differing from either in a polar current—analogue to the polarisation of light—and whether there is a direct connexion between these main currents and electro-magnetic, especially those mysterious earth-currents, are questions easy to ask; but excessively difficult to be answered, even by philosophical physicists of the highest eminence. To such authorities, however, the writer would appeal for some particular consideration of the following facts:—

With polar currents of air, electricity is above par, or plus; the air is harsh, clouds in it have a hard, oily appearance, animal as well as vegetable life is peculiarly affected in various familiar ways, tension is above par; and all these peculiarities are *constant* qualities, independent of temperature of night or day, and of the time of year.

With the opposite or tropical current, different effects are well known to most people; but the comparative absence of electrical tension (or plus electricity), the soft, watery aspect of clouds in such air, and the absence of hard edges or outlines, unless influenced in some degree by the polar element, have not been noticed generally, though they are properties expressive of tropical winds solely (west to south in this hemisphere) in their (unmixed) purity.

In all frequented parts of the world, these peculiar characteristics of the so-called easterly and westerly winds have been carefully noticed, and found to be irrespective of locality,—land or water, whether with an ocean to the east, or with a continent in that direction, or the converse. It may be remarked, in passing, that easterly winds everywhere (prevalent, not merely temporary currents), either mixed or deflected, are polar—derived more or less from the nearest pole; and that so-called westerly winds are tropical, from a tropical direction, or mixed tropical and polar currents. There is much to be remarked, in connexion with these distinctive features, respecting atmospheric colours, clouds, auroras, and meteors, but not admissible here.

Outline maps, with movable windmarkers, and cyclone glasses or horns, are useful in forecasting weather; and full consideration should be given to the probable position, direction, extent, and degree of progress of those central areas or *nodes* round which the principal currents usually circulate, or turn, as they meet and alter, combine with, or succeed one another.

Here dynamical considerations, with comprehensive comparisons

of statical facts, are most important; and to treat them even approximately well, with such quick despatch as is requisite, demands aptitude and experience.

Those who are most concerned about approaching changes, who are going to sea, or on a journey, or on a mere excursion; those who have gardening, agricultural, or other out-door pursuits in view; may often derive useful *cautionary* notices from these published expectations of weather: although (from the nature of such subjects) they can be but scanty, and imperfect, under present circumstances.

Objection has been taken to such forecasts, because they cannot be always exactly correct, for all places, in one district. It is, however, considered by most persons that general, comprehensive expressions, in aid of local observers, who can form independent judgments from the tables and their own instruments, respecting their immediate vicinity, though not so well for distant places, may be very useful as well as interesting: while to an unprovided or otherwise uninformed person, an idea of the kind of weather thought probable cannot be otherwise than acceptable, provided that he is in no way bound to act in accordance with any such views, against his own judgment.

Like the storm-signals, such notices should be merely *cautionary*, to denote anticipated disturbance *somewhere* over these islands, without being in the least degree compulsory, or interfering arbitrarily with the movements of vessels or individuals.

Certain it is, that, although our conclusions may be incorrect, our judgment erroneous, the laws of nature and the signs afforded to man are invariably true. Accurate interpretation is the real deficiency.

Seamen know well the marked characteristics of the two great divisions of wind, in all parts of the world, and do not care to calculate the intermediate changes or combinations to two or three points. They want to know the *quarter* whence a gale may be expected—whether northerly or southerly—in general terms.

Every seaman will admit, that however useful, and therefore desirable, it would be to know exactly the hour of a storm's commencement—as our acquaintance with meteorology does not enable such times to be fixed—the next best thing is to have limits assigned for extra vigilance and due precaution, which limits are clearly stated, in all the printed popular instructions, to be from the time of hoisting the signal until *two or three days afterwards*.

But, say some, and justly—are ships to remain waiting to avoid a

gale that after all may not happen? Are fishermen and coasters to wait idle, and miss their opportunities? By no means. All that the cautionary signals imply, is "Look out." "Be on your guard." "Notice your glasses, and the signs of the weather." "The atmosphere is much disturbed."

Perhaps sufficient thought has not always been given to the consideration of mere pecuniary loss by wear and tear, risk, accident, delay, and demurrage, caused by a gale at sea; balanced against the results of waiting for a tide or two, perhaps once in two months, when cautioned by a storm-signal.

Be this as it may with coasters, short traders, or even screw-colliers, the question is entirely different with ordinary over-sea or foreign-going ships; especially when starting from a southern or from a western port. To such vessels a gale in the Channel, or even during the first day or two after clearing the land, must always be very prejudicial. Officers and men are mutually strange; things are not in their places, often not secured; and the ship, perhaps, is untried at sea. Of course, however, these remarks are inapplicable to fine, first-class ships; and to powerful, well-managed steamers, independent of wind and weather, which start at fixed hours.

It is scarcely too much to say, even now, that if due attention be paid on the coasts to cautionary signals—and, at the Central Office, to the telegraphed reports—no very dangerous storm need be anticipated without more or less notice of its approach being generally communicated around the British Islands; or to those particular coasts which probably may be most affected by its greatest strength.

But this hardly applies to our extreme outposts, such as Jersey, Valencia, Nairn, and Heligoland, because their remoteness, invaluable as that condition is for warning other places nearer the centre, is an obvious reason why they cannot always be forewarned themselves.

In using the daily Weather Reports, it ought to be kept in mind that only one state of atmosphere in twenty-four hours is there recorded (excepting for rainfall); therefore it is only by comparisons and due reference to previous reports that probable consequences can be fairly inferred. It is advisable, in considering the forecasts, to look at the second as in some degree part of the first; time of weather continuing not being a certain or reliable notice.

In conclusion, it may be impressed on the reader, that this system

is a tentative *experiment*. Each month, however, has hitherto added useful facts, and increased our acquaintance with the difficult, though not uncertain, dynamics of the subject. Nothing, however, could have been well effected in an attempt to apply meteorology to daily practice with confidence, had not a foundation of facts existed in the works of scientific authorities—whose statical records and invaluable deductions afforded a sufficiently extensive basis on which to rely while utilising modern powers of communication by telegraph, from any stations, simultaneously.

SURVEYS OF SPAIN.*

We learn from our correspondent, M. Coello, the accomplished geographer, who is now directing the topographical survey of Spain, that the following additions to our science have recently been made.

During the year 1861 persevering progress has been made in the great triangulation of the country.

All the chains of the triangles of the first order have already been studied, including those which relate to the whole circumference of the kingdom.

The chains of the meridian of Madrid, both to the north and to the south of that capital, have nearly all been measured, and will be completed before the end of the present year.

The parallel of Madrid to the west has been finished as far as the frontier of Portugal; and the measurement of the triangles of the parallel of Ciudad Real to Badajoz has been commenced. The triangles required to complete the spaces to the west of the meridian of Madrid have been laid down as far as that of Salamanca.

The triangulation of the second order is finished for the whole province of Madrid, as well as that for a part of the adjacent country. We are now only waiting for the results of the last calculations for compensation, which have just been completed, in order to fix the length of the great base of Madrideojos, and begin the long calculation of the work which has been done.

This year these different undertakings will be continued, and signals will be fixed for the measurement of the parallel to the east of Madrid, with the intention of making, concurrently with this work, simultaneous and reciprocal observations to determine the geodistic level, and settle with accuracy the elevation of Madrid above the Mediterranean, presumed at present upon the most received existing

* Signor Coello, Corr. Member R.E.S., Director of the Topographical Department in Spain. (Translated by Dr. Hodgkin, Hon. Foreign Secretary.)

calculations to be 660 mètres, which is, perhaps, within ten inches of the truth.

The topographical labours thus undertaken in the province of Madrid will be continued during the year. The corresponding land registration will at the same time be proceeded with, and the levels will be very carefully taken.

The maps are on the scale of $\frac{1}{75000}$, and of $\frac{1}{7500}$ for cities and buildings. The classifications, territorial valuations, and dispositions in the public archives, will commence as soon as a portion of the province is completed. The topography is executed with very great accuracy.

During the past year a portion of the Tagus, and of its tributary the Gallo, has been mapped to form a portion of the hydrography of Spain.

The geological department has completed its work in the provinces of Burgos, Santander, and Madrid, and has commenced with those of Leon, Zamora, and Avita.

In the department of Woods and Forests various topographical details have been obtained in the provinces of Santander, Burgos, Valencia, Asturias, Oviedo, and Leon.

All these works have been executed under the direction of the Junta-General Estadística, which is appointed by the Government to take charge of scientific researches regarding the Spanish territory.

The Hydrographic Department has published various interesting works, more especially some on the Philippine Islands.

The War Department has completed the itinerary of Navarre, and published a beautiful atlas of the campaign in Africa, accompanied with very interesting topographical documents. The itineraries of different provinces are in progress, and some of them will be shortly published.

The results of the statistical returns made at the close of the year 1860 are now in the press, under the direction of the Statistical Board. This is also the case with a very complete Directory of all our provinces. Similar returns from the colonies have likewise been made, and will soon be published.

The same department has published Geological Memoirs regarding the provinces of Avita and Leon, and likewise the Topography of the province of Madrid, with a geological map. The whole of these are due to Don Coriano di Prado.

The plans for railways, canals, and roads, made for the most part

by the Department of Public Works, have been prepared with zeal and activity, and some interesting results have been obtained in relation to topography and comparative levels of the country. A Memoir has likewise been published respecting the Public Works in Spain, and is accompanied with a map.

Other interesting works by private individuals have been finished, and in some instances published, amongst which are essays on the ancient Geography of Spain; and special mention must be made of a memoir on the site of the city of Munda, which obtained the prize of the Academy of History.

M. Coello has continued the publication of his Provincial Atlas, and has recently brought out the maps of four provinces. In the beginning of last year he published a general Map of Spain, corrected from the most recent data, a copy of which he has kindly presented to our Society.

RUSSIA.*

Ry

Although important questions of social and political reform have been engaging the attention of all intellects in Russia, yet the advance of geographical science there, I am happy to say, has not been retarded.

The Imperial Geographical Society of St. Petersburg continues to display its wonted zeal and activity. Fresh materials are yearly contributed by it towards the elucidation and amplification of the geography both of Russia and of the regions by which that country is bounded.

The expedition sent to explore Eastern Siberia has made considerable progress in its labours. According to latest accounts from Port St. Olga, Mr. Schmidt, chief geologist of the expedition, had started to examine the coast from the estuary of the Amur to Possiet Harbour. Mr. Glehn, his coadjutor, was employed in a geological exploration of the island of Saghalin, while Mr. Brylkin directed his attention to its ethnography. On the return of the expedition to St. Petersburg in the autumn of the present year, and on the termination of the labours connected with it, the Imperial Geographical Society will devote its time and means to further scientific enterprise. The Council have already under consideration the adoption of measures for organising three new expeditions. One will examine the causes that have led to the gradual shallowing of

* John Michell, Esq., F.R.G.S.

the Sea of Azof; the object of the second will be to explore that portion of the Russian frontier which adjoins the Chinese territory on the east; the character of the third will be statistico-ethnographical, and the field of its labours will be the interior governments of Russia.

The progressive shallowing of the Sea of Azof had attracted attention for many years. It was supposed to be caused by ballast being thrown overboard from merchant-vessels. On this supposition it was at one time proposed to prohibit the entrance into the Sea of Azof of all ships, either Russian or foreign, not ballasted with water. The Government, however, did not adopt this measure, as doubts were entertained of the correctness of the above supposition.

In 1860 the Academy of Sciences of St. Petersburg arrived at the conclusion that the shoaling of the Sea of Azof had been going on for centuries; that it was not general, but only limited to certain parts; that it was not produced by a discharge of ballast, but was attributable to different local conditions, such as the state of the sea-bottom, proximity of the steppe, violence of winds and currents, &c. It further expressed its opinion that a scientific expedition to examine these circumstances would be productive of useful results.

These conclusions met with the approval of the august President of the Imperial Geographical Society; and the Society was authorised to send a scientific commission to the Sea of Azof. An annual sum of 5000 silver rubles (810*l.*), for two years, was assigned from the imperial treasury to defray the expenses of the expedition, which is now being organised.

In October last the Russian Minister for Foreign Affairs informed the Imperial Geographical Society that a commission would proceed in the spring of this year to trace the boundary-line between Russia and China on the east, and invited the Society to take advantage of this opportunity for scientific exploration. The Council gratefully accepted the proposal, and have now under consideration the ways and means for acting on it.

According to the treaty concluded between Russia and China in 1860, the line of demarcation should extend from the sources of the Yenisei to the Tian-Shan range of mountains, south of Lake Issyk-kul. The starting-point to be taken is the landmark of Chabin-Dabaga, on the frontiers of the governments of Tomsk and Yeniseisk. This mark, erected in 1728, according to the treaty of Kiakhita, constituted then the most distant point of contact between the two

empires. From Chabin-Dabaga the frontier runs in a south-westerly direction as far as Lake Dsai-San, extends along the ridge of the Djungarian Alatau, crosses the river Ili, and then follows the direction of the Tian-Shan to the confines of Kokan. This line of frontier, which has a length of about 2000 versts (1333½ miles), has already been visited on many points by Russian scientific travellers. The country still presents a vast field for future exploration. The region extending to the west of the sources of the Yenisei has not as yet been visited by any traveller.

A commission has been appointed, on the recommendation of Mr. Bezobrazof, for organising an expedition into the interior of Russia, with the special object of collecting statistico-ethnographical data. The commission, presided over by Mr. Kalatchof, consists of MM. Artemief, Bezobrazof, Vernadski, Vtorof, Kalinofski, Kostomarof, Maksimof, Nebolsin, Neiharat, Stackelberg, and Schepkin.

Among the cartographical labours of the Imperial Geographical Society a map of Eastern Siberia, by M. Schwartz, deserves special notice. It consists of seven sheets, and embraces on a scale of 1:1,100,000 the fluvial region of the Amur, the southern portions of the Lena and Yenisei, and of the island of Sahalin. Although many maps of Eastern Siberia have latterly appeared, that of M. Schwartz is the most reliably correct. As its indications are very detailed, and based on exact astronomical determinations, it will serve to complete and rectify the hitherto existing maps.

Mr. Helmersen has compiled a new geological map of Russia. Several years have elapsed since the appearance of a similar map by Sir Roderick Murchison, M. Verneuil, and Count Keiserling, while the intervening period has been rich in geological discoveries in Russia. In many localities the limits of formation have been more distinctly defined; and this has induced Mr. Helmersen to construct a new map, with the assistance of the well-known Russian geologists, Pander, Hofmann, Abich, Auerbach, Barbot, Grewingk, Feophilatof, and Holmberg.

The 'Journal of the Imperial Geographical Society' for the past year contains, as formerly, articles of high geographical interest. The materials on Central Asia are, in particular, abundant. I may especially direct attention to the sketches of Djungaria, and to a description of the Chinese province of Nan-lu, or Little Bukhara, by Captain Valikhanof, the son of a Kaisak sultan. This traveller and Russian savant, as a native of Central Asia, intimately acquainted with the languages and customs of the countries he visited, enjoyed

every facility for studying and describing these hitherto almost inaccessible regions. In the garb of a Kokand merchant, in 1859 he succeeded in reaching Kashgar, and now gives an interesting account of his journey. He minutely describes the atrocities committed by Valikhan, Hodja of Kashgar, who in 1857 ordered the execution of the deeply-lamented Adolphe Schlagintweit, and throws further light on the death of that traveller.

The Sketches of Djungaria, with a detailed description, historical and geographical, of Little Bukhara, will shortly appear in English before the public, and will doubtless prove a valuable addition to our knowledge of the geography of those countries.

ASIA.*

The Russian traveller, N. de Khanikof, who has been engaged in making up the deficiencies in our imperfect knowledge of the Aderbeijan, in Persia, has made a new map of that region, which he has had engraved at Berlin. He has distributed several copies of it, and transmitted his observations regarding that interesting mountain district to the Academy of Sciences in Paris, and also to our Secretary, Dr. Shaw, for the use of the Royal Geographical Society.

An uncommon degree of regularity characterises the mountain-ranges of this province of Persia, which is bounded both on the east and on the west by lofty longitudinal ridges. To the east the Talish Mountains separate it from the basin of the Caspian; and to the west the chain of Kandilar forms a barrier between it and Mesopotamia. To the north and to the south of the Aderbeijan these two chains are joined by longitudinal elevations: the one, commencing at Mount Savalan (of 4752 mètres), joins the Kandilan chain in Kurdistan; the other, coming off from the Talish Mountains, and known as the Buzgush chain, joins Mount Sehend (of 3505 mètres). The space included between Mount Savalan and the Talish chain of mountains is occupied by the plain of Mughan, and the Salt Lake of Urmia is situated in the region lying between the Sehend and the Kandilan chain. The lowest point of this part of Persia, that is to say, the level of the Lake of Urmia, is 1250 mètres above the level of the sea; and the highest point in the province of Aderbeijan is the summit of Ararat, 5169 mètres high. The line of perpetual snow varies in elevation from 3600 to 3800 mètres. This regular arrangement of the surface of the district, and the character of the

* N. Khanikoff (translated by Dr. Hodgkin, Hon. Foreign Secretary.)

climate, dependent on its high position, are very favourable for topographical work. The state of the atmosphere is generally so clear that one is never long without being able to see some one of the lofty summits which serve as landmarks for reference; and it rarely happens that mirage or dry fog interrupts the distinct vision of objects for an entire day. Notwithstanding the precision with which the skilful topographers from amongst the officers of the Caucasus who acted under his orders, as well as himself, endeavoured to execute the work of laying down the itineraries of detached regions, it would be impossible to combine these independent labours without the basis of some well-determined astronomical or geometrical observations. These happily were not wanting, as he had latitudes and longitudes in Persia which had been settled by M. Lemm, and the results of the triangulation of the Caucasus under the direction of General Chosdzko. The former gave a series of fixed points in the neighbourhood of the Araxes; and the latter supplied the like data, rigorously established, between Erivan and the basin of the Caspian. Hence the localities given in the north and middle of Khanikof's map have their exact bearings; and it is only in the south that he had no other data than such as were obtained by azimuths measured with the help of the magnetic needle. The errors to which such observations are necessarily liable will be corrected when the Anglo-Russian commission for defining the Turkish and Russian boundary shall have published its numerous astronomic data.

That part of the map which is strictly new is the southern portion, in which is situated the Lake Urmia, with its islands; the itinerary from Marand to Khoi; and the topographical details in the two provinces of Persian Kurdistan, Lahijan and Ushnu, in which he had the good fortune to complete the researches of his predecessors, Generals Monteith and Rawlinson.

CHINA.*

Geography is already beginning to share in the advantages derivable from Lord Elgin's treaty, the conditions of which so greatly improve the position of the foreigner in China, whether traveller or official, merchant or missionary. Until that treaty came into operation, our countrymen could only penetrate the interior of this vast country in the face of legal prohibitions, and

* Sir Harry Parkes, K.C.B., H.B.M. Consul at Shang-hae.

with the liability of arrest at the hands of the native authorities. The new treaty gives British subjects the right of travelling with a passport through the whole land; and so readily has this permission been availed of, that, in the first year after this right was obtained, twelve out of the eighteen provinces of China have been visited by our countrymen, together with Manchoo Tartary, the cradle of the present dynasty.

First among these explorations comes the ascent of the Yang-tsze-Kiang, so gallantly undertaken by Colonel Sarel, Captain Blakiston, Dr. Barton, and Mr. Scheresheffsky, the details of which are familiar to us all; while the high sense entertained by this Society of the services these gentlemen have rendered to geography has been marked, as you have seen this day, by the presentation of the Patron's Medal to Captain Blakiston. In tracing the great Yang-tsze along 1800 miles of its course, those travellers crossed the six central provinces of Keang-soo, Ngan-hwuy, Keang-se, Hoo-pih, Hoo-nan, and Sze-chuen; and thus carried their explorations upwards of a thousand miles beyond any point that had previously been openly visited by foreign travellers. The first 700 miles of that river's course is now made familiar to Europeans by the opening of the port of Han-kow to foreign commerce, and there is every prospect of the high expectations that have been formed of the capacity of that great central mart being fully realized. Within eight months of the opening of that port it had been visited by nearly 200 foreign craft, consisting for the most part of small steamers; and the foreign trade thus conducted amounted during the first six months to two millions sterling.

Some particulars of no less than seven other journeys, undertaken by our countrymen in the north, centre, and south of China during the past year, have been made public. In the north, Mr. Morrison, our Consul at the new port of Che-foo, with Captain Harcourt as his companion, travelled overland to his post from Teen-tsin in the month of January, and profited by the opportunity thus afforded him to follow the Grand Canal along nearly 300 miles of its track, to visit the tomb of the great sage Confucius, which is to be seen at Kew-foo, in the charge of his own descendants, a family with a pedigree of 2500 years, dating from the time of the sage himself. Mr. Morrison also visited Tse-nan, the capital, and other places in the hitherto unexplored province of Shan-tung, and the journey took these travellers over 700 miles of country, for the most part new to Europeans. Six months later, two other foreigners set out

in an opposite direction, and travelled overland from Teen-tsin to Mouk-den, the capital of Manchoo Tartary. They were struck by the manner in which this once Tartar country has been virtually converted into a Chinese province by the superior energy of the Chinese emigrants, and report that the Manchooks, even in this their native land, have lost their ground entirely in all parts of the country where anything is to be made by agriculture and commerce; and that those who remain, by adopting Chinese manners, customs, and *language*, have become, to all intents and purposes, Chinese, and have been absorbed into the predominant race. Later in the year, in November and December, an expedition through the two northern provinces of China, Pe-chih-le and Shan-se, was undertaken by Messrs. Richards and Slossin. Starting from the same point—Teen-tsin—they appear to have ascended the high plateaus to the north of Peking, and to have skirted the Mongolian steppes until they reached Shan-se. They travelled in this province as far as its capital Tai-yuen, and then, turning westward, re-entered Pe-chih-le, and visited Paou-king, the capital of the latter province, on their way back to Teen-tsin. The journey occupied the travellers 46 days, during which time they appear to have crossed the Great Wall four times, finding it in a state of decay that may be feared is typical of the country of which it is the chief monument, and they estimate the total length of their journey at 1560 English miles. The flourishing and populous condition of most of the country through which they passed accounts for the success of the new northern port of Teen-tsin, the foreign trade of which, in the first year of its being opened, has reached the considerable sum of two millions sterling.

In the centre of China, four gentlemen—Messrs. Dickson, Thorburn, Beach, and Bonney—travelled, in the month of April, from Canton to Han-kow, a distance of 756 miles, which they performed in 18 days; their journey differing from those above recited as being made entirely by water, with the exception of one day's land travel across the mountain-range that divides the province of Kwang-tung from Hoo-nan. Following the course of the north river in the first-named province, and the Seang River in the latter, they thus traversed both those provinces from south to north, and were the first modern explorers of the great Tung-ting Lake, by which they reached the Yang-tsze and Han-kow. In Cheh-kiang, Mr. Baker, having recently ascended the Tseen-tang River, and visited the celebrated green-tea districts of Ngan-hwuy, has again

gone over ground previously travelled by Mr. Fortune, but to find in this instance that the previous prosperous condition of those important tea districts has disappeared before the rebel scourge, and that scenes of industry have been replaced by desolation and destruction.

In the south of China, the Rev. Dr. Legge was the first foreigner to ascend, in April of last year, the east river in the Kwang-tung province to a distance of about 300 miles; and the Rev. Mr. Irwin and companions have penetrated up the west river, in the same province, to a somewhat higher point than that reached by the expedition under Captain McCleverty in the spring of 1859, for a description of which we are indebted to our associate Lieutenant Brine. The opening of Formosa to foreign trade gives promise also of our shortly obtaining further information from that island, which is interesting not only from its commercial productions, but also from the presence of aboriginal tribes in its centre and eastern coast, of which little is as yet known.

It is satisfactory to hear from all these travellers that no serious obstacles were placed in their way either by the Chinese authorities or the people; and that, while inconvenienced at times by the not unnatural curiosity of the latter, when anxious to gaze on foreigners for the first time, they received from them, in most cases, friendly welcome and assistance. Our treaty-right to enter the country having thus obtained an effectual recognition, it will be seen that China is now thrown open to the researches of the traveller, subject, however, to the difficulties arising out of the deplorable disorders which are at present rife in so many of its provinces. Different parties of rebels or robbers, all acting independently of each other, were met by Colonel Sarel's party in Sze-chuen, by Mr. Morrison in Shan-tung, by Mr. Baker in Cheh-keang, and by Mr. Irwin in Kwang-tung; while Dr. Dickson's party, on the other hand, travelled from Canton to Han-kow—or from the south to the centre of China—without falling in with any of these destructive hordes; and Messrs. Richards and Slossin traversed the provinces of Shan-se and Pe-chih-le under similar favourable circumstances.

AUSTRALIA.*

Every new year brings with it, as we might well expect, recitals of fresh discoveries in this vast and important region of British

* By Sir Roderick Impey Murchison, Vice-Pres. A.G.S.

colonization, of which, in a broad sense, it may be said that we have as yet only occupied the eastern, southern, and western coasts, and partially their adjacent interior lands. No sooner had we bestowed one of our Gold Medals on McDouall Stuart, for his adventurous exploration from South Australia to the northern water-parting, than we heard of his having again started in the endeavour to reach the sea which bathes the northern shore of the continent. In the mean time, however, whilst he has again returned, after reaching the water-parting of tropical Australia, that end has been attained on a more eastern meridian by the expedition under the command of Richard O'Hara Burke, assisted by the geographer William J. Wills. Notwithstanding the belief of a great number of old colonists and travellers, and which is still entertained, that horses and bullocks are to be preferred for these adventurous journeys, the ascertained fact is, that the scheme suggested many years ago by the Geographical Society, of employing camels as the beasts of burden, is that by which the continent has first been traversed from south to north by any of our countrymen.

Whilst two Australian colonies were thus eager rivals in these discoveries, and that the flourishing younger colonists of Queensland, on the north-east, have been extending the range of their feeding-grounds to zones almost intertropical, and approaching towards the Gulf of Carpentaria, the north-western limits of Western Australia have been vastly extended by the successful survey, by Mr. F. T. Gregory, of that large portion of the very extensive lands which lie between the settled parts of that colony and the Cambridge Gulf.

Let us then devote, in the first place, a few words to the consideration of each of these last important discoveries.

The Victorian expedition, though perfectly successful in the main object of discovering a track to the north, through lands which are for the first time made known to us as being capable of occupation at no distant day, and in reaching the mouth of one of the tributaries of the Gulf of Carpentaria, had, alas! a tragical end. Its bold leader, Burke, as well as his companion, the accomplished geographer, Wills, have fallen, but not until their observations have assured us that they reached the northern shore, at the mouth of the Flinders River. And here we may well applaud the suggestion of Sir H. Barkly, that the great newly-discovered belt of good land between Cooper Creek and the south end of the Gulf of Carpentaria should be called "Burke Land;" so that the name of the

gallant explorer will thus be perpetuated on the east, as that of Stuart has been properly associated with the chief highlands on the west. As the gallant Burke and his associates had long been absent, and reports arose of their failure and difficulties with which they were beset, it was highly to the credit of the coterminous colonies of South Australia and Queensland that they both made vigorous endeavours to aid in the rescue.

One of these efforts, as made by the direction of Sir Richard McDonnell and the Government of South Australia, proceeded over a considerable extent of new ground to the north-eastern part of that colony; and allusion to it will presently be made, as well as to other expeditions from Victoria and Queensland.

In considering the steps by which this great work of exploration of the interior has been brought to its present advanced state, we must not forget the feats of the laborious and able Surveyor-General of New South Wales, Sir Thomas Mitchell, who laid down sure bases of operation for those who were to follow him. It has also been well said by a recent traveller to the Darling,* and who has gone over much of the same ground, that, of all the expeditions subsequent to those of Mitchell, that under the command of our Medallist Sturt threw most light on the region to the north and north-west of Menendie. "The chivalrous Eyre," he writes, "had previously penetrated to the forbidden shores of Lake Torrens, and the indomitable Stuart has since very nearly crossed the continent; but both of them I think would admit, that to Captain Sturt belongs the great honour of having opened the door to the vast central regions of Australia."

The Council of our Society has, indeed, judged well in assigning a Medal to the family of the lamented Burke, the leader of the Victorian expedition; and in offering a watch as a recompence to the sole survivor, the stout-hearted and faithful King, whose simple narrative of the deaths of his commanders, Burke and Wills, and of his own preservation of life among the kind natives, has touched the hearts of all who have read the tale.

The details of the labours of Burke and Wills in traversing and retraversing the continent have been so recently laid before the public, that it is unnecessary here to recapitulate them. We must not, however, pass over the Report of the Commissioners who were

* Mr. Haverfield.

appointed by the Governor of Victoria to inquire into the circumstances connected with the sufferings and death of Burke and Wills. Endeavouring to ascertain the true causes of that lamentable result, they have thrown the chief blame on Mr. Wright, in not having left adequate supplies of provisions and clothing at Cooper Creek. They also impute some discredit to the Exploration Committee, for not stimulating Mr. Wright to advance from the Darling, where he had been (as they say) in a state of "fatal inactivity and idling." And lastly, they reprove Mr. Brahe, for retiring from the relief depôt before he was rejoined by his commander, Burke; though, from the great responsibility and the want of sufficiently precise instructions, they excuse that gentleman for his unfortunate decision.

Whilst they regret "the absence of a systematic plan of operation on the part of the leader," they express "their admiration of his gallantry and daring, as well as of the fidelity of his brave coadjutor and their more fortunate and enduring associate King; and they conclude with recording "their feelings of deep sympathy with the deplorable sufferings and untimely deaths of Burke and his fellow comrades."

The friends of Burke must, indeed, derive great satisfaction from referring to the Despatches of Sir Henry Barkly, who generously vindicates the conduct of the gallant leader. In a letter to Sir R. Murchison he thus writes:—"It is true that he (Burke) was by nature impetuous, but we have in reality only heard one side of the case; and I do not feel quite sure that he did not leave definite instructions—possibly even in writing—with his second in command, and at the Cooper Creek depôt, though none are forthcoming or acknowledged to have existed." "At the worst," he says, "all that can be said of his conduct is, that he relied on others proving as brave and self-sacrificing as himself; that he was out of his reckoning on this point, and lost his own life in consequence." Finally, Sir Henry Barkly has well told Her Majesty's Secretary for the Colonies, that "a less daring leader might never have crossed the continent, or solved the problem so often vainly attempted."

But whilst from the expedition under Burke one man was saved, we have since been informed of the deaths of four white men, who were not long ago massacred in the interior, and of whose loss we should have been entirely ignorant, had not the Government of

South Australia, under Sir Richard McDonnell, sent out, as before said, an exploring party from the south-west, to cut in upon the route of Burke.

After passing over lands, in some parts sterile and saliferous, in others watered and productive, the searching party of McKinlay and his assistant Hodgkinson (which was also well found in camels, as well as with horses and provisions) met with the relics of four white men, the skulls and skeletons of whom showed incontestable proofs of their having been murdered. Having obtained possession of a native who had evidently been one of the murderers, since his body exhibited healed-up wounds, and the lodgment of a ball as well as of buck-shot under the skin, he gave to the explorers a recital of the massacre, and how the natives had eaten the flesh of their enemies. As the hair of the victims was still adhering to their skulls, and seemed to the travellers to be of the same colours as those of Burke and his party; and further, as what was taken for "camel" dung was found near the spot, they jumped to the natural conclusion that in this spot (lat. $27^{\circ} 15' \text{ s.}$, long. $139^{\circ} 50' \text{ e.}$, and consequently not far from the return route of Burke) they had really discovered the remains of Burke and his three companions. On their return to the settlements of the colony, however, this theory was entirely dispelled by the true account of the deaths of Burke and Wills, and of the safe return of the sole survivor, King. Who, then, were these unfortunate four explorers of the interior? That they were British subjects, and not natives, is certain; not only from the skeletons and the colours of their hair, but also by the discovery of an English almanac of 1858. We also know that they had made a vigorous resistance, which is established, not only by the testimony of the black man, but also by the gun-shot wounds inflicted on him. Then, again, we have the proofs of the savage nature of this band of the aborigines, by learning that, after this one native left them, McKinlay's party were shortly assailed by a large well-armed body, who were only repelled by a hot fire from our countrymen.

What a mystery is this, then, and how are we to explain it? Surely we ought to be able to obtain, from the settlers on the outskirts of the colonies of Victoria and South Australia, some information to throw light on the journey into the interior of any persons who may be identified with these hapless men! Again, is it not strange that, at so short a distance as exists between the site of this massacre and that of the deaths of Burke and Wills, the

character of the aborigines should differ so essentially? for we are assured by the diary of the last days of Wills, that he and his associates were treated with great kindness by the natives. We also know, from the testimony of the survivor King, that when these poor creatures (among whom he lived until the relief finally reached him) saw the bodies of Burke and Wills they wept over them, because they saw that they might have saved our countrymen from starvation. We thus know that there are generous and tender-hearted aborigines in Australia, as well as those who appear to be irreclaimable and cruel savages; and this, too, in tribes not far distant from each other.

Leaving this problem to be solved between our friends the ethnologists and philanthropists, we may in the mean time anticipate that with such energies as have been displayed by the explorers proceeding from our settled colonies in the last thirty years, including the older researches of Mitchell, Eyre, Sturt, Leichhardt, and others, there can be no doubt that the colonists of Queensland will soon extend their pastures to the Gulf of Carpentaria; and that the northernmost settlers of South Australia, following up the track of Stuart, will ere long found establishments in the bosom of the noble recesses of Cambridge Gulf and the northern Victoria River, where fleets can anchor securely, and where the vegetation is luxuriant.

If the northern coast of this great continent is thus destined to be occupied by migrations from the east and south, it has recently been to a considerable extent successfully surveyed from the west by Mr. Frank T. Gregory; who, in extending the boundary of Western Australia, and in demonstrating the existence of large tracts of fine land, reaching eastwards to beyond east long. 121° , in lat. 21° , has led us to hope that not many years will elapse before the warm desire of British geographers will be realised by actual occupation—at all events by the description of the headlands and inner portions which lie between Nickol Bay and Cambridge Gulf.

Having conveyed his party, with horses and provisions, by sea, from Perth to Nickol Bay, Mr. Gregory first explored the interior to the south-west, or towards the tracts lying on the north-western exterior of the settlements of West Australia, which he had surveyed in 1848. Following up a river, which he named the Fortescue, for 180 miles, and which flows through good lands, he reached elevations, which he termed the Hammels' Range, and through which he travelled by a pass 2000 feet above the sea, in lat. $22^{\circ} 15'$, and east

long. $118^{\circ} 4'$. Beyond this range he found extensive fertile plains running far westwards, or towards the colony, as far as the eye could reach. Travelling still further with a smaller party to the south-west, he fell in with a large river flowing from the N.E. This he named the Ashburton, from our noble President; and, judging from the fine pasture-lands on its banks, he believes that this tract (which he connected by triangulation with Mount Augustus and the Lynn River of his former survey) will become in a few years a valuable district of the province.

Having returned to the vessel, to recruit and replenish his stores after this his first journey of 780 miles, Mr. Gregory then pushed his survey south-east and eastwards, and passed in succession rivers which were called the Yule, the Shelley, and the Shaw, and then to the recipient of the two last rivers—a finer stream, to which the name of De Grey was given, in honour of our last President, under whose auspices the expedition was initiated. Again, much fine land was observed, the united journeys amounting to 2040 miles.

The clear and interesting sketch of this survey which has already been given by Mr. Gregory will be much enhanced when his maps are constructed in the accurate manner with which he works out all his data. In the mean time we already learn that this newly-discovered region, consisting of a succession of terraces that rise from the shore to lofty plateaux 2500 feet above the sea, has its culminating point in Mount Bruce, at an altitude of 4000 feet; whilst within the limits of the route followed not less than 2,000,000 acres are fitted for grazing purposes, and at least 200,000 acres are suitable for cultivation. The fruits and plants which are indigenous include, among the latter, tobacco, sandal-wood, and palms; and the author conceives that, notwithstanding its *quasi* intertropical position, the district is as well adapted to the growth of wool, as grounds in the same latitude in Queensland have proved to be; whilst he feels confident that there are also considerable tracts specially available for raising cotton.

The varied eruptive rocks of the country, whether of granitic or of volcanic origin, and the different sedimentary formations, from high plateaux of older sandstone to the youngest and more calcareous and sandy deposits, have been carefully observed. Again, meteorological and magnetical data have been carefully registered; and we are informed that the aborigines, who are of fine stature, some of them exceeding 6 feet in height, might be made useful in labour, and would by no means prove unmanageable or troublesome

if properly treated; whilst a valuable pearl-fishery may also be established in Nickol Bay.

This survey, being the last of the very important services which have been performed by Mr. Gregory, is the more entitled to our approbation, as it was undertaken at our recommendation to Her Majesty's Colonial Secretary, the Duke of Newcastle; and we have to thank His Grace for countenancing this expedition in conjunction with the local Colonial Government.

The complete success of this exploration, without the loss of a man, is a decisive proof of the skilful and well-considered pre-arrangements and conduct of the leader, and will, we trust, induce Her Majesty's Government to continue to place reliance on any suggestions which may in future proceed from the Council of the Royal Geographical Society.

In concluding these observations on the recent progress of discovery in Australia, we may well advert to the strenuous efforts made by the colonists of Victoria and Queensland to succour Burke and his party. Naturally anxious as we have been respecting the issue of the searching expeditions sent from Victoria by sea, and overland from Queensland, the news just received is highly gratifying to all geographers and philanthropists. Sir Henry Barkly has written to Sir R. Murchison, stating that, notwithstanding the wreck of the *Firefly* tender, of which we had heard, on one of the reefs in Torres Straits, the good management of Captain Norman, the commander of the *Victoria* steamer, has been such that the *Firefly* was emptied of water and tugged round into the Gulf of Carpentaria, in spite of much stormy weather. Arriving at the mouth of the Albert River, men and horses, with abundance of stores, were landed from those ships, as well as from two colliers, which had also been sent round; so that Mr. Landsborough, who had been recommended for the search by Mr. Gregory, was at once enabled to explore for some distance into the interior.

In the mean time Mr. Walker, who was sent with a party of aboriginal troopers from Brisbane and Rockhampton, having gained the mouth of the Albert, passed in his route the river Flinders, near the sea, and there, to his delight, found the distinct tracks of Burke's party; thus realising the truth of the narrative of the sole survivor, King, that Burke and Wills really reached the salt water of the Gulf of Carpentaria. This discovery further confirms the belief of the astronomers and geographers who inquired into the subject, that it was the mouth of the Flinders, and not of the

Albert, which the gallant adventurers had reached. Being supplied with provisions for four months, Mr. Walker then returned to the mouth of the Flinders, to follow up the trail of Burke; and, as he had been gone 80 days when Captain Norman left the mouth of the Albert, we may reasonably expect to hear soon of his arrival at Cooper Creek and the colony of Victoria.

Whilst Walker is thus occupied, Mr. Landsborough is proceeding southwards, on the meridian of the Albert River, to Victoria; and thus by this double exploration the whole of the region to which Sir H. Barkly has worthily assigned the name of "Burke Land" will be thoroughly made known to us.

That which to many cautious persons seemed to be a chimera a few years ago, but which the writer of these lines has always regarded as a most desirable result, will therefore ere long be accomplished, and the shores of Tropical Australia will, through its great indentations, the Gulf of Carpentaria and Cambridge Gulf, be fairly occupied by our colonists, who, communicating with the southern colonies, from whence they spring, by the lines opened out by Stuart and Burke, will carry on an advantageous intercourse with the Eastern Archipelago, and afford grand and useful bays of refuge to all imperilled vessels. Truly we may now rejoice that our Council has wisely, as well as generously, judged in assigning a Medal to the family of Burke, and in not omitting to mark their sense of the faithful conduct and truthful narrative of the brave old soldier, King.

Whilst such has been the progress of discovery in hitherto unknown lands, our knowledge concerning the real mineral structure of the regions already colonised has been largely increased. The admirable Geological Maps of Victoria, prepared by Mr. Selwyn, and the palæontological illustrations thereof, by Professor McCay, would do honour to the most advanced country in Europe; and though the other colonies cannot as yet boast of similar proficiency in maps and sections, every geologist knows how much his science is indebted to the Rev. W. B. Clarke, for his long-continued and successful endeavours in developing the true geological structure of New South Wales.

If from Australia we extend our observations to other regions of Australasia colonised by Britain, you perceive the rapid progress which is made in the development of wealth, commerce, and civilisation. Thus in Tasmania, thanks to the vigorous endeavours of my young and able friend Mr. Charles Gould, coal-fields of value

in the north-eastern portion of that great island have been laid open, and the valuable substance, dysodile, has been extracted.

Again, in New Zealand the Local Governments are exerting themselves to procure the services of scientific men, who, possessing an acquaintance with geography and topography, are well versed in the sciences of geology and mineralogy, and can indicate upon maps the real value of the subsoil of each district. Thus, whilst the able geologist, Dr. Hochstetter, who was one of the men of science who sailed round the world in the Austrian frigate *Novara*, has made us well acquainted with the nature of the rocks and the usefulness of the fossils found around Auckland, my friend Dr. Hector (with whose merits this Society is so well acquainted, through his admirable labours as the senior scientific officer of Palliser's expedition in North America) is now the geologist, geographer, and naturalist of the thriving Scottish colony of Otago, in the southernmost of the New Zealand islands.

So earnest, indeed, are the colonists of New Zealand to obtain a scientific insight into the nature of their rocks, that applications have recently been made to Sir R. Murchison to secure the services of a competent person to conduct a geological survey of the newly-settled district of Wellington.

AFRICA.*

It is long since tidings have reached us from either of our two medallists, Livingstone and Speke, in whose explorations our Society takes especial interest, both from the brilliancy of their former achievements and the importance of their present undertakings. Just before the anniversary of 1861 we heard of Livingstone's departure from the Zambesi, in his small steamer, to examine the Rovuma River and ascertain whether any basis existed for the often-expressed belief that that river would afford a convenient and a neutral highway to the vast regions of the Niassa, independent of the complications of Portuguese territorial claims. The result of his examination reached us shortly afterwards: it was far from satisfactory. His steamer of light draught was unable to ascend the Rovuma for more than a few miles, before it became necessary to return hastily, else she would have been left grounded by the falling waters until the ensuing rainy season. Livingstone then revisited the Zambesi and established the members of the University

* Francis Galton, Esq., Hon. Secretary, R.G.S.

mission in the healthiest quarters he could find near the banks of the Shiré.

We have heard nothing whatever of Speke since our last anniversary, except a fragment of news which is exceedingly satisfactory, though it left him at a stage and a date little removed from where he last wrote to us. It will be remembered that he had then described himself in trouble. The desert of Ugogo was peculiarly parched in 1861; he and the natives had difficulty in obtaining food, and a large number of his porters had deserted and left him. We have since learnt, through a native merchant who had interchanged a few passing words with him, that Speke was accompanied by a fresh body of porters, that he had extricated himself from the desert of Ugogo, and was travelling rapidly and in excellent force on the way to Unianyembe.

Provisions will not fail him if he emerges this summer at Gondakoro on the White Nile, for by aid of the funds liberally subscribed by many Fellows of this Society and by Mr. Consul Petherick's furtherance, boats laden with grain were despatched by that gentleman, under a proper escort, from Khartum up the White Nile, early in this year.

The present condition of the White Nile is such as to grieve deeply those who believe commerce to be the most effectual agent in civilizing Africa. Fifteen years ago the natives along its shores were mostly inoffensive and hospitable to travellers; but the stream of trade that has yearly passed along it, uncontrolled by any moral supervision, and mostly in the hands of reckless adventurers and lawless crews, has driven the numerous tribes along its banks into so general and deep an hostility against strangers, that the White Nile cannot now be ascended except by an armed force of considerable magnitude.

The hopes we entertained last year of an increased knowledge of the Upper White Nile, through the independent labours of M. Lejean and Dr. Peney, have failed us, owing to the illness and return of the former gentleman and the premature death of the latter. Dr. Peney did some good service to geography before he died: he travelled westwards from Gondakoro for 60 miles, and there apparently struck the penultimate stage of Petherick's former expedition. If this be the case—and the identity of the names of the places and tribes and geographical features leave hardly room for doubt—an enormous rectification becomes necessary in the estimated extent and

direction of Petherick's itinerary. Peney also travelled above Gondakoro, through the cataracts, to nearly the furthest point of which we have even a rumour, and he places his goal at about one degree south of Gondakoro, and on absolutely the same meridian.

The determination of the altitude and snowy summit of Kilimanjaro, by the Baron von der Decken and his geological associate Mr. Thornton, has gladdened African geographers, who felt it was little creditable to their science that so interesting a subject should remain year after year open to question. It is a pleasure to find that the wanderings of missionaries, solely in the pursuit of their calling, should have led them here, as it has often done elsewhere, to be the first discoverers of new lands and pioneers to more accurate research.

An elaborate report on the dominions of Zanzibar, by Lieut.-Colonel Rigby, has been published in the Selections from the Records of the Bombay Government. It appears from subsequent accounts that the condition of that island has lately fallen into a very disturbed state.

On the coast of Africa opposite to Kilimanjaro, Captain Burton, our ever active medallist and now H. M. Consul at Fernando Po, has materially contributed to a survey of the large creeks and river-mouths which form a characteristic feature of those shores, and in the knowledge of which we are unduly deficient. We hear also of his ascent of the lofty Cameroon Mountain, and shall doubtless receive from him a detailed account of that extinct volcano, which in its origin, latitude, and proximity to the sea, as well as by its prominence, holds a position on the West Coast curiously corresponding to that of Kilimanjaro on the East of Africa.

The French have exerted themselves with energy in reconnoitring the tributaries of the great bay or estuary of the Gaboon, all of which take their rise in the flanks of the neighbouring mountain chain through which the Ogobai, familiar to us by the writings of Du Chaillu, bursts its way, in its course from a more distant interior.

Numerous explorations have been made in Senegambia and in the North-Western Sahara. The travels of Boo Moghdad are perhaps the most important. He left St. Louis on the Senegal, and passed to Mogador, on the coast of Morocco. Lambert's journey to Timbo is also of great interest. Duveyrier has returned to Algiers with large stores of information gathered in the Sahara, which he is preparing for publication, and which African geographers await with

keen interest. We are sorry to hear that that energetic young traveller is suffering very severely from the effect of his many journeys.

Heuglin's expedition in search of information bearing on Vogel's fate, in Wadai, has made some advance in his necessarily circuitous route. He landed at Massowa and spent some months in Abyssinia, awaiting the favourable season for onward travel. His researches in that country have been original and minute, especially with regard to the geology and hypsometry of its northern borderland.

Our medallist Barth is engaged in the publication of a work of paramount importance to African ethnologists, namely, an elaborate collection of vocabularies of the tribes of Central Africa. It is mainly from a comparison of dialects that we may hope to unravel some portion of the mutual relations and early history of the various races which inhabit that large portion of the earth's surface, and we rejoice that the present work has been undertaken by so accomplished a philologist and geographer.

Finally, large maps of Africa are in progress of publication, the one by Dr. Petermann, in his comprehensive '*Mittheilungen*,' and the other by Mr. Ravenstein, in England.*

OUR OWN LABOURS.†

The relation of the Society to the wide range of science which it cultivates may be referred to with satisfaction. Through its influence, or by its Associates, it may be identified with most of the enterprises which enlarge the knowledge of the more remote regions or add to the details of those more intimately known. Although the progress of geography—a science which has been the growth of so many ages—can be but imperfectly estimated by the brief retrospect of the limited period to which this notice must be confined, still the past *two* years have been marked by some very important accessions to our knowledge.

It might perhaps be inferred that the industry of modern tra-

* Since the Anniversary Meeting, intelligence has been received of Dr. Livingstone's navigation of the west coast of the Nyassa (in an open boat) up to lat. $11^{\circ} 20'$; during the whole of which distance (200 miles) its width appeared never to exceed 60 miles, no large river was seen to flow into it, and no certain account was obtainable of its northern termination. It lay between highlands; its waters were of great depth, and continually and dangerously stormy. The same mail informed us of the deaths, from fever, of Bishop Mackenzie and of another important member of the University mission.

† Alexander George Findlay, Esq., F.R.G.S.

vellers, so well and so persistently carried on, would have left to these later times but few regions unexplored, or features to be noticed in primary discovery; but the late Transactions of our Society will lead to the inference that there lies hidden much more than has been revealed, and that our motto "*Ob terras reclusas*," will still apply almost as justly to the countries close around us as to the still unknown mysteries of Africa or Australia. The last volumes of our Transactions publish the details of primary discovery and exploration more extensive and important, of countries absolutely unknown before, than those contained in the first, when the true course of the then mysterious Niger, or the earliest journeys into the interior of Australia, were described.

There is one evidence of the appreciation of the Society and its usefulness in the unbroken chain of travellers and labourers which are and have been connected with it; those of later times being often the friends, pupils, or associates of those who first enriched its volumes with the results of their enterprise, and whose works may be traced continuously from its origin to those which I shall briefly allude to presently. The Annual Addresses of former Presidents will show how large a share has been taken in the progress of Geography by the Royal Geographical Society since its foundation.

EUROPE.—In Europe the work of general research into the minute details of geography is far too great for individual labour, and the Addresses of your Presidents will show what great undertakings are carried on by various Governments; but that there is room for personal enterprise is shown by the communications of our well-known Associates Capt. Sherard Osborne, Capt. Spratt, and Major Stokes, on the course of the Lower Danube, descriptions of great national utility.

Our Corresponding Member, Professor Paul Chaix, has sent us an account of the surveys connected with the Great Federal Map of Switzerland, which have been in progress for half a century. Professor Holst, of Christiania, has also given an account, translated from the Norse for us by our Secretary, Dr. Norton Shaw, of the important and excellent surveys in Norway, which have been proceeding since the year 1779, a period at the dawn of geodetical science.

We have an interesting account of a portion of the Caucasus, the country of the Lesghi tribes of Hilly Daghestan, by the Baron de Bode, son of our deceased Associate. This communication, and a

more widely extended dissertation on the Caucasus generally, by Captain D. Cameron, F.R.G.S., draws attention to an enchanting country and a most interesting people, or rather variety of races. As a region for tourists, the Caucasus would seem to present attractions and novelties far exceeding those met with on most beaten tracks.

Iceland was visited by the expedition which, under Capt. Allen Young, examined into the geographical positions for the proposed Atlantic telegraph by the northern route; and our excellent Associate and Medallist, Dr. Rae, has given us a graphic account of his crossing this interesting island.

ASIA has afforded a large field for the enterprise of those of our Associates who have penetrated into its less known regions recently laid open to us by political events.

The most important of these is the navigation and survey of the upper portion of that great river which is the pride of China, the Yang-tsze-Kiang. In a late volume of the *Journal* an account is given by our Associate, Mr. Laurence Oliphant, the Secretary to the Embassy, of the ascent of the river to Han-kow, 623 miles above its mouth. To this expedition was also attached Capt. Sherard Osborne, who, in the Arctic regions, in the Black Sea and elsewhere, has done such good service to geography. Another Arctic officer, Mr. Court, who, under Sir R. M'Clure, performed the North-West Passage, also aided in this good work. Mr. Blackney's name must also be associated in this expedition, as having given us an excellent account of his observations. It will be fresh in the memory of all that these officers and their coadjutors ascended this mighty river in vessels of large draught of water to this great distance with our eminent Fellow, Lord Elgin.

It must be a subject of gratification to the Society that the further exploration of this mighty and important river should have been executed through the personal zeal of our Associates, who have just received the highest mark of our appreciation, and who, like the officers of the preceding expedition, have won laurels in very different quarters of the globe. This topic is alluded to in another portion of this Address; but it is difficult to overrate the importance of these communications, either in a commercial sense or in relation to our future intercourse with that industrious and peculiar people.

In another part of China, the war led our Associate Lieut. Brine, with an expedition under Capt. M'Cleverty, R.N., up the

Si-Kiang; and he has given us an account of the country through which the ships passed for 75 miles, and of the capabilities of the river for commercial purposes. This and the interesting communications of Capt. Sprye, and our Associate Dr. M'Cosh, on the countries on the west frontier of China, have been alluded to in a previous Address.

It is to be regretted that political circumstances prevented the expedition under Capt. Smyth, accompanied by Lieut. Jackson, Dr. Stewart, &c., from proceeding into Chinese Tartary last year. When our relations with China shall have attained a more firm basis, this important subject may be renewed, and will assuredly have again, as in the first case, the support and countenance of the Society.

Lieut. Oliver, R.A., has sent us some notes on the country west of Canton—another addition to our knowledge of this hitherto almost hidden country, which has been directed to be published in our Proceedings.

In an adjacent region we have had some interesting matter communicated by the late M. Mouhot, on Cambodia, where he had been resident for some years; and Mr. Edw. O'Riley has sent some notes on a tour through the Shan States. The communications of Mr. D. O. King of his journeys to the south-east of Bangkok, alluded to in a former Address, and the notes on the same country, collected by our Associate Mr. Jas. Campbell, demonstrate how busy is the spirit of inquiry respecting these countries, which have remained almost entirely closed to Europeans till recent times.

Foremost in the research stands our indefatigable Corresponding Associate and Medallist Sir Robert H. Schomburgk, busy in the acquisition of information, and active in travelling through this hitherto little visited country and enervating climate. He has forwarded us several memoirs on the country of Siam, in which he represents the British Government: one on a boat-voyage to the town of Pecha-buri, and many particulars of a region which we only knew from vague conjecture or crude delineation. His Report on the trade and resources of this country are of high interest. Another of these communications was an account of a painful journey he had accomplished up the great river Menam, and thence on the backs of elephants to Moulmein, in our own possessions on the Bay of Bengal. It is thirty years since he gained his first reputation in the Transactions of the Royal Geographical Society, by his survey of Anegada in the West Indies, and twenty-three years

since he received its Medal for his extensive and excellent researches in British Guiana and neighbouring countries. These are so well remembered that they need only be adverted to here to associate his earlier adventures with the later communications which we have welcomed.

In JAPAN the Society and our Associates have taken a deep and active interest, and have zealously endeavoured to advance our knowledge of this important country. It will be sufficient here to allude to the Papers sent by our Associate Mr. Rutherford Alcock, Her Majesty's envoy to that country. His accounts of his journeys into the interior, and of his ascent of their sacred mountain Fusi-yama, form an epoch in geographical progress.

Another narrative is also most interesting, that of the journeys of Mr. Pemberton Hodgson into the interior of the untravelled and uncivilized island of Yeso. The discussions which ensued on these Papers, and the remarks of Mr. Laurence Oliphant, Sir Frederick Nicholson, Mr. Wylie, and others, must be of great interest to those who have watched the early stages of our intercourse with the Japanese. One fact of importance, often repeated by geographers, is manifest by the experience of Mr. Hodgson in these several journeys. Although unarmed, and accompanied by ladies, he travelled safely amid the demi-savage inhabitants, who had never before seen a European, without the slightest obstruction, and receiving perfect courtesy and hospitality. This fact, which may be also gathered from the experience of many in all parts of the world, teaches a lesson to those who first meet with untutored men, that they should be treated with that consideration, the want of which has generally been the origin of that opprobrium too frequently bestowed upon what is retaliation.

Political events have placed another country prominently before the geographical world. The great river Amur has been found to be one of the most important rivers of Northern Asia, as by it the vast and isolated central steppes of Mongolia can be readily approached by water-conveyance; and it is even stated that, with a very small amount of road and canal, the traffic could easily be carried on from the Pacific to the Baltic. The Addresses of Sir Roderick Murchison will tell how much the Russian explorers and surveyors have done to elucidate the geography of this region, and the excellent map constructed by Mr. Arrowsmith will show its features at a glance.

In the last published volume of our Transactions we have a

further accession to Asiatic geography, viz., a translation of the narrative and account of a Journey to the Tian-Shan, or Celestial Mountains, in Russian Tartary, by P. P. Semenov, which was undertaken under the auspices of the Imperial Russian Geographical Society. M. Semenov was the first European who visited (in 1857) this gigantic range—one of the four which traverse Asia in a parallel direction, only two of which have been explored, the Himalayas from the south, and the Altai from the north. Another translated Memoir on the same country is also given, by M. A. Golubev, who has travelled on the Chinese frontier.

There are two Papers on the beautiful valley of Kashmir by our Associates, Mr. W. H. Purdon, c.e., and Capt. H. H. Austen. In addition to a description of the physical features of this interesting country, they give a farther account of that most remarkable and important work, the Trigonometrical Survey of India, as carried over it. In former Addresses and Memoirs this immense undertaking, carried on by the East India Company, first under Colonel Lambton, and then under the control of our respected Associates Sir George Everest till 1843, and Sir A. S. Waugh, has been dilated on. In these Papers the services rendered to science, and to geography in particular, by Capt. T. G. Montgomerie, are stated. The refined operations of a survey of this order, carried over a peaceful and accessible country, possess none of the interest or romance with which these great Indian observations are invested. In the triangulation and survey of Kashmir the officers met with great difficulties; much of the service was carried on during the great Indian mutiny, surrounded by hostile people, and amid physical difficulties never before encountered in such a manner. The whole history of the vast survey of Northern India may be cited as a fine testimonial of the progress of primary exploration.

Of the large and almost unknown island of New Guinea we have had some account from our Associate Mr. A. Russell Wallace, for some time its sole European inhabitant. Mr. Wallace's zeal in the cause of science is well known, and his accessions to our knowledge of the natural history of this vast island have been shown in other places.

Mr. Spenser St. John, F.R.G.S., now in Haïti, has given us a most valuable account of the north-west coast of Borneo, where he was Consul-General—a further accession to our knowledge of the country first developed by our Associate Sir James Brooke.

The itineraries of Captain Claude Clerk, F.R.G.S., in Persia, in

1857-9, will be read with interest, affording valuable materials to the geographer. Captain Clerk describes his journeys between Tehran and Herat in the North, and Tehran and Bushire in Western Persia.

Proceeding to another part, we have a graphic and excellent account of the Andaman Islands, in the Bay of Bengal, by our Associate Dr. Mouat. This little group and its curious inhabitants seem to have been scarcely visited, though much in the way of commerce, till it was chosen as the place of exile for some of the Indian mutineers.

Sir Henry Rawlinson, who, twenty-three years since, received the Medal of the Royal Geographical Society as a comparative geographer of the highest order, and who, since his first recognition by this Society, has laboured so intensely, and with such admirable results, has advocated in our pages a most important proposal for connecting by electric telegraph our Indian possessions with this country. The route proposed is by way of Constantinople and the Euphrates, and thence through Persia, &c., to Kurráchee. The Ottoman Government has constructed the line as far as Bus-sorah, a route advocated in the early days of this Society by our respected Associate and Medallist General Chesney, as the readiest way to India for an overland transit. Although the progress of ocean steam-navigation has altered the relations which then existed, it is gratifying to know that the views endorsed by the Society have been so far recognised now as to form the basis for the modern system of telegraphic connexion. The discussion which ensued on Sir H. Rawlinson's proposition demonstrates that it was one of the highest geographical and national importance.

AFRICA has engrossed a large share of the attention of the Royal Geographical Society. From the time that the Society's first Medal was awarded to Richard Lander, thirty-one years since, for solving the great problem of the course of the Niger, to the present moment, when we are looking for the consummation of its endeavours to elucidate that other ancient enigma, the true sources of the Nile, the Society has been more or less occupied with obtaining information of the physical and moral condition of this great continent and its people.

At the first period above named, our maps of Africa exhibited its interior as nearly one universal blank, or with only the vague surmises of crude speculation. Now the geography of inner-Africa presents a very different aspect. The pages of our Transactions

are an index to the progress of discovery, which has been gradually displacing the imaginary arid desert by the well-watered and fertile country, or the supposed tenantless solitude with busy and populous tribes.

It is needless to advert to the early travels of Dr. Livingstone across the continent. The relation of the Geographical Society to that great traveller, and the wonderful successes due to his indomitable courage and untiring energy, must ever be a subject of congratulation.

The Society has for many years most zealously advanced those attempts to resolve the great geographical problem of the true sources of the White Nile; and all are now looking with great interest for tidings of the expedition under our Medallist Captain Speke and his companion Captain Grant, in the confident hope that the experience its leader gained when associated with Captain Burton in the Somali country, and in the journeys to the great African lakes, will enable him to complete successfully what was then commenced, and definitively set at rest that question of so many ages' standing. It is needless now to speculate as to any connexion there may or may not be between the head-waters of the Nile and the Victoria Nyanza, which he visited in July, 1858, as this will all be determined, it is believed, when we hear of the traveller's further progress. This topic is elsewhere adverted to, as is the expedition of Consul Petherick, who also travels under the auspices of the Society to the aid of Captains Speke and Grant. We look hopefully that before the next session we may welcome these gallant men on their successful return.

A brief account has been received from Mr. Richard Thornton, of an expedition to the great volcano Kilimanjaro, which has been thought to have some connexion with the physical geography of the Nile basin. Mr. Thornton was at first connected as geologist to Dr. Livingstone's expedition, but afterwards joined the Baron von der Decken, a Hanoverian gentleman, to the mountain. This journey is of importance; for while it fully confirms the accounts of the missionaries given in our former Proceedings, it has the additional claim of survey and geological observation. Being an isolated volcanic cone, Kilimanjaro does not form part of that great eastern meridional axis which was so well argued upon by Sir Roderick Murchison in former years, and which has been reasoned on by some as the Mountains of the Moon of ancient geographers. The Baron and his associate did not reach this great division be-

tween the Eastern and Western waters, and therefore the Nile question, probably, is not affected by the result of their journey.

Dr. Livingstone's proceedings are noticed in another part of this Address; a brief allusion to them here will therefore suffice. His visit to the Victoria Falls of the great river Zambesi, and his farther observations on this important river, are of great interest. Connected also with his operations is the exploration of the river Shiré and the great Lake Shirwa. The more exact knowledge thus placed before us, instead of the imperfect accounts given by the Portuguese of former years, are of great importance in the future conduct of commercial or other relations with these regions. In the progress of this expedition an important part has been taken by Mr. Thomas Baines, well known as the artist of the North Australian expedition, and also in Kaffraria. Mr. Charles Livingstone, Dr. Kirk, the botanist of the expedition, and Mr. May, our Associate, have well seconded their leader in examining and reporting on the country. The examination of the Rovuma River, although not deciding whether it is the outlet of one of the chain of the East African lakes, is of importance.

The geography of Eastern Africa has thus assumed an entirely new aspect within a very brief period. The exact knowledge we now possess contrasts in every way with the chaos of opinion and imperfect observation which before these expeditions were organised were our only guides. Although much may be required before we can have a perfect and accurate geographical picture of Eastern or Central Africa, yet the data thus laid down will be the foundation of that which will be subsequently acquired. The representations we now have demonstrate how imperatively necessary it is that astronomical observation should be connected with the necessarily vague estimates of a traveller over an unknown country.

On the shores of Western tropical Africa, our indefatigable medallist, Captain Richard Burton, is active in the acquisition of information concerning the country where he represents Her Majesty's Government. The accounts of his visits to various places in the Bights of Benin and Biafra will be read with much interest, and there is no doubt but that his varied talent and extensive knowledge will accumulate much valuable information on these countries. He ascended and surveyed the Ogun or Abeokúta River, in company with Captain Bedingfield, our Associate, who is well known to us in connexion with his examinations of the Congo, and as one of Dr. Livingstone's expedition.

Dr. Baikie, R.N., our Associate, who has been long on the Niger

and Chadda rivers, endeavouring to establish a commanding position for England in Central Africa, has written hopefully of his prospects, should his expedition be retained. Intelligence has just arrived that the *Sunbeam* has ascended the river for 600 miles.

Another communication records the proceedings of Commander Dolben, F.R.G.S., during his ascent of the river Volta for 120 miles for the first time by white men.*

With the increasing importance of the commerce of the Gold Coast and Western Africa generally, these narratives acquire additional interest, and inspire the hope that a more intimate acquaintance with the physical condition of these countries will lead to a beneficial intercourse with the people who have so long been debased by the slave-traffic.

NORTH AMERICA.—For many years, as is well known, the Geographical Society took a most active part in the promotion of Arctic discovery, during the progress of which nearly the whole of the northern limits of America was accurately surveyed; and it is this service that developed the energies and skill of so many excellent officers, whose geographical labours have been so frequently mentioned in this and many previous Addresses, and are distributed throughout the pages of our Transactions.

During the period of these searching expeditions, one portion of the British dominions, now famous as British Columbia, was almost less known and visited than these icy and remote regions; and the explorations and surveys of our medallist Captain Palliser, with his coadjutors, Captain Blakiston, Dr. Hector, and Mr. Sullivan, which have been treated of recently in former Addresses, have proved of immense service. The sudden interest with which the gold discovery has invested this country has given a high value to these explorations, which the Geographical Society so earnestly forwarded.

In the early days of the colonization of a country all exact information is of the utmost importance, and the reports of our Associate, Commander Mayne, R.N., of Lieutenant Palmer, R.E., of Mr. Justice Begbie, Mr. Downie, and others, as given in the Journal, must render great service. Captain R. W. Torrens has also given us an account of his ascent of the Nass River for 116 miles above Fort Simpson, near the borders of Russian America, and of the evidences of the existence of gold that were found in this novel journey. Our lamented Associate, Captain Grant, has sent further notes on Vancouver Island and its capabilities.

* For the interesting explorations of M. Du Chaillu, see vol. xxxi. of the Journal of the Royal Geographical Society, page clxxx, &c.

On *Central America* we have had a paper on the republic of Nicaragua, by Vice-Consul G. R. Perry, and another from our Associate Captain Bedford Pim, proposing a new transit-route across the American Isthmus through the lake of Nicaragua.

In *South America* our Associate Mr. Clements Markham, while engaged in the collection of the cinchona-plant among the mountains of Peru, which were to be transferred to the Himalayas for cultivation in our Indian possessions, has gathered much geographical information respecting the head-waters of the Purus, or Madre de Dios, one of the great affluents of the mighty Amazon, and also of the geography of the province of Carabaya, in Southern Peru.

From this same region we have a very curious narrative and illustration of a portion of the country to the south-east of Quito, sent us by Mr. R. Spruce, accompanied by his own remarks on the same region of the Quitoian Andes. Dr. Jameson, of the University of Quito, has given us an account of an excursion from that city to the Mountain Cayambe, lying on the Equator.

AUSTRALIA.—The progress of Australia forms a very important chapter in the history of man. The rapidity with which exploration has been followed by colonization is remarkable. Almost all discovery made in this vast country may be said to have been made in connexion with the extension of its pastoral and commercial capabilities. The many explorations which the Society has encouraged and recorded since its establishment, have added a new world to the uses of civilised man. The first paper in its Transactions relates to the infant days of the Western colony, and its first volumes record the earliest discoveries of Sturt, Cunningham, and other travellers, who pushed over the boundaries of its limited Eastern settlements. How soon these important discoveries were utilized, is familiar to us all; and in later days, since Eyre and Sturt, our worthy Medallists, first attempted to traverse the continent from south to north, the benefits which have accrued from their enterprise have well justified the awards of the Society. In the last volume of the Journal is an account of the ascent of the Murray and Darling Rivers, by Mr. Randell, in a steam-boat. This fact, and the account of the settlements on the courses of these rivers, is an example of the importance of these primary explorations.

But the Transactions of the last two years are not of inferior importance or interest to those adventures detailed in the earliest volumes of the Society, at a period when the whole continent of Australia was a field for vague conjecture. In another part of this Address the wondrous journeys of Burke and Wills, and of McDouall

Stuart, are dilated on, and which, judging from the past, are destined to have as great an influence on the future of Australia as those of our early Medallists.

While thus recounting the travels in the Eastern portion of Australia, we cannot forget the claims of that family of Gregorys who have so advanced our knowledge of the Western part by their admirable exploring capabilities. Their merits have been fully explained in former Addresses, and the last journey of Mr. Frank Gregory will stand foremost in the ranks of discovery. These topics have been alluded to previously.

Besides those above, a long array of names may be cited as having added to our knowledge of Australia in the pages of our Transactions. Among these we have recently those of Wilson, Landor, Chimmo, Freeling, Hack, Flood, Babbage, Warburton, Sinclair, MacDonnell, Selwyn, Dempster, Dalrymple, &c. &c. The actual social benefit which has been and will be derived from their observations must be very highly estimated.

We have had recently a very excellent account of the Fiji Islands, in the Pacific Ocean, by Mr. Bensusan, long a resident there, and by Dr. Ph. Berthold Seemann, whose long experience as a naturalist has added much to our knowledge of this beautiful group, as well as of the other countries he has visited. Though there may be a difference of opinion as to the propriety of our colonising the Archipelago, there can be none as to the beauty and interest which belong to the islands themselves.

The OCEAN has received some share of attention from our Associates. There are many features of marine physics which are still very obscure, notwithstanding the great accumulation of independent observation which has been collected. The depth, the movements, the constitution of the ocean, are each the subject of controversy, and in each branch of inquiry there is ample field for individual enterprise.

During the expedition undertaken for ascertaining the practicability of a northern route for an Atlantic telegraph-cable, the sounding-voyage in the *Bulldog*, under our Medallist, Sir F. Leopold M'Clintock, of Arctic celebrity, has given us probably more exact data on the depth of the ocean than has been before obtained. We have now accounts of about 260 of these experiments in the North Atlantic, by which the depth has been stated at from one to four or seven miles. But many, nay most of these soundings, are open to very great doubt, and we have yet much to learn as to the depth of the ocean. In the voyage of the *Bulldog*, besides the actual evi-

dence of depth given by bringing up the bottom in most cases, there were some new facts elicited, which, while they overturn much previous speculation, create a desire for a great extension of the inquiry. The fact of a live star-fish and a worm brought up from enormous depths ($1\frac{1}{2}$ mile), would not have been thought possible prior to its being demonstrated. Another singular feature is that the specimens of mud brought up in these high northern latitudes, consisting almost exclusively of minute organisms, *alive*, principally foraminifera, globigerina, &c., are almost identical with those obtained by the United States officers, Lieut. Craven, U.S.N., &c., from great depths within the tropics, beneath the tepid waters of the Gulf-stream. This demonstrates that there must be a similar water-climate at each of these distant regions. Therefore the theory that there is neither light, heat, nor physical conditions necessary to support animal life at these enormous depths may be abandoned, and, while it overturns all this, it opens up a new and vast field for observation and speculation as to the actual constitution and influence which the ocean bears upon the great economy of nature.

Mr. Hopkins, a name well known to meteorologists, has given us a Paper on the conditions of the ocean and other topics relating to the North Pole.

Our Associate Captain Irminger, of the Royal Danish Navy, has given us a very interesting dissertation on the ocean currents in the vicinity of Iceland, which brings forward several new features.

Another important ocean topic has been also added to by the observations of Lieut. Heathcote, I.N., F.R.G.S., on the difficult and complex system of currents in the Bay of Bengal. These are directly applicable to nautical purposes, and are of much value.

In this summary of the special application of geographical enterprise which it has been the sphere of the Royal Geographical Society to disseminate during the last two years, much is necessarily omitted for want of space. They are special as compared with the great extent of inquiry open to geographers. In the more extended sense of general geography, we may notice a paper by that eminent physical geographer, our Corresponding Member, Captain M. F. Maury, on the Southern Ocean and the Antarctic Pole. In mathematical geography Colonel Sir Henry James has described his new projection alluded to in a former Address, and Sir John Herschel has given us another communication on a similar subject. One of our Honorary Secretaries, Mr. Spottiswoode, has brought mathe-

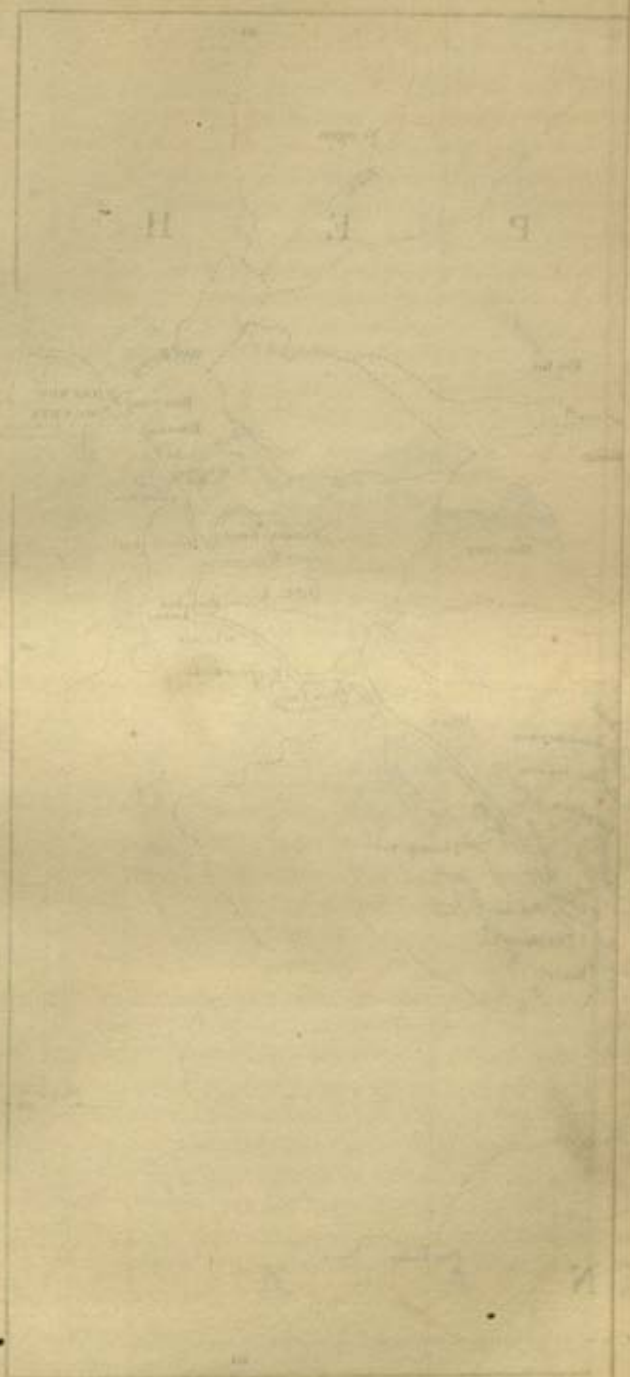
matical investigation to bear on the probable conditions of mountain ranges, and has given us another paper on a method of obtaining longitudes from the moon's greatest altitude.

Much more might be said as to the influence of the Society in the acquisition and future dissemination of geographical knowledge through the wide-spread influence of its numerous Members, of the cordiality existing among us, and of the many causes to which we may attribute the present prosperity of the Society.

Having now concluded the Report which the contributions of various distinguished geographers have enabled me to lay before the Society, I may be allowed, perhaps, to say a few words on my own behalf.

This is my second year of office. Allow me, then, before I leave the chair, to thank you for the considerate kindness with which you have dealt with my frequent absences, my many shortcomings. I resign my office—for I have no doubt of his election—to Sir Roderick I. Murchison, one whom you have long known, whose knowledge and skill and conciliatory power you have long learned to appreciate. If the Society has increased under me, it has been owing to his advice, and that of the able Council with which you surrounded me. It is to their zeal and efficiency, assisted by our excellent Secretary, Dr. Shaw, that we are indebted for our growing importance as a public body.

We have, in fact, become a public department, if that appellation is to be assigned rather to the amount of service rendered than to the cost incurred. We collect, revise, digest, and amplify all the geographical information supplied to the various public offices, and communicated to us. We keep it ready for their use, and for the use of the merchant, manufacturer, and colonist. We organise and direct missions of discovery, fitted out for public objects at the public expense. We have no members of our body hanging on, in a state of apathy and indifference, for the sake of salary or superannuation. The Council is ever young in zeal and energy, if not in years. Whatever is done, is done as a labour of love, with the enthusiasm of votaries. Add to this that the subjects we treat of are of universal interest, and universal application. They appeal to all our sympathies, whether of the present, the future, or the past. Such a Society, so conducted, and so supported, can never fail.



CHINA,
THE
YANG-TSZE KIANG,
FROM
HAN-KOW TO PING-SHAN

Reduced from the large Chart of which this is an Index,
from the Survey of
CAPT. T. BLAKISTON RA.
by
John Arrowsmith.

Note: The River below the Yangtze Lake
is from Commander Wards Survey.

Chung Shing
The distance along the River is 100 miles to the Yangtze Lake, & 100 miles to the Yangtze River. The distance from the Yangtze Lake to the Yangtze River is 100 miles. The distance from the Yangtze River to the Yangtze Lake is 100 miles.



PAPERS READ

BEFORE THE

ROYAL GEOGRAPHICAL SOCIETY.

I. — *Notes on the Yang-tsze-Kiang, from Han-kow to Ping-shan.*

By Lieut.-Col. HENRY ANDREW SAREL, F.R.G.S., 17th Lancers.

Read, November 11, 1861.

AN expedition, consisting of the undermentioned officers, left Shang-hae on the 11th February, 1861. They were allowed by Admiral Sir James Hope to accompany the naval expedition under his command as far as Yo-chow, from which place they proceeded in native boats. The original intention was to penetrate through the province of Sz'chuan to Lassa, and thence to cross the Himalaya Mountains to the plains of India. As will be seen, the unsettled state of the country in the West prevented the carrying out of this plan.

The party was composed as follows:—Lieut.-Col. Sarel, 17th Lancers, F.R.G.S.; Capt. Blakiston, R.A., F.R.G.S.; Dr. Barton, F.R.G.S.; Rev. S. Schereschewsky, American Mission; interpreter; four Sikhs of the 11th Punjab Infantry; and four Chinese attendants.

The notes commence from the time of leaving Han-kow, the river below that port having been surveyed and reported on.

From Yo-chow to Ping-shan the river has been carefully surveyed by Capt. Blakiston.

Specimens of mineralogy, ferns, and insects have been collected and forwarded to England.

The country above Han-kow is flat, large tracts on both banks being flooded in March; but a low range of hills crosses the river shortly above the junction of the Han with the Yang-tsze. About 10 miles above Han-kow, on the left bank, are some low grassy hills, admirably suited for the encampment of a large body of troops: the situation is dry and airy, with the river close at hand and a creek running into the country. Ten miles higher up, two hills, called Ta-kin-shan or the Great, and Sian-kin-shan or the Little, Golden Hill, are passed on the left bank, the little hill being the larger; near these are hills on both banks, after which the country near the river again becomes flat, though low ranges are visible at

some distance inland. The river here averages a mile in width. Numbers of trading junks were seen on their way between Hu-nan and Han-kow *via* the Tung-ting lake. Most of the boats come from Hiang-tang and Sun-chu (fu) in Hu-nan, and some few from Chung-king in Sz'chuan. Some boats, roughly constructed (their top sides being of deal planks, unplanned and unvarnished, furnished with matting sails), bring coals from Pow-king (fu), a town in the interior of Hu-nan. When these boats reach Han-kow, after discharging their cargo, they are broken up and sold for the wood.

Numerous timber-rafts are also brought down the lake to the Yang-tsze: they are made in divisions, with huts built on them for their conductors, as in Russia. A division can be sold at any place without interfering with the rest of the raft, and the rafts being connected, like a train of boats, can turn the sharp bends of the small rivers they have to descend to the lake.

Lo-je-kow.—At the village of Lo-je-kow the rebels had left their traces; a small temple and some of the buildings were in ruins. These fanatical savages destroy everything they come across, their only idea being utterly to obliterate all traces of the Tartar government and to begin *de novo*. A few years will leave them nothing to govern even if they succeed in destroying the Tartar dynasty, which I much doubt: already many of them are said to be heartily tired of rebellion, and would doubtless return to their allegiance if they thought they could do so with safety to themselves; but rebels can expect no mercy from a Chinese government, nor have their actions been such as to entitle them to it.

King-kow and Sing-ti.—Between Han-kow and the entrance to the Tung-ting lake, only two places deserving the names of towns are passed; the first being King-kow on the right, and the second, Sing-ti, on the left bank. At the latter there is some trade and a custom-house, where all the junks coming down the river pay toll.

Some miles before reaching the entrance to the lake, the river narrows to about half-a-mile between two bluffs of red sandstone. Soon after passing them, a large rock, more than 5 feet above water in March, shows in midstream. This is covered when the river rises, and would be dangerous, until sufficiently under water, for ships to pass over it.

The river between Han-kow and Yo-chow is straight for the first and last parts of its course: part in the middle makes a loop 28 miles round, the neck being only about a mile across. A canal cut here would be a great assistance to the navigation; the ground being perfectly flat and only a few feet above the river, there would be no difficulty in making one, and the current of the river would be sufficient to keep it clear. In June we passed through a narrow cut made by the river, finding from 4 to 10 feet of water, with a strong current across this neck. The reach below the lake entrance

is long and straight, running about north-east and south-west on the way from the river to Yo-chow at the outlet of the lake. A great number of sheep and goats with a few ponies were seen grazing on a low grassy flat covered in floods: these were the only sheep seen on the river for a distance of nearly 1800 miles.

From Han-kow, Sir James Hope had taken a junk in tow for our expedition, the *Coromandel* and *Bouncer* being the only ships brought on farther than that town; from Yo-chow the ships returned, and we proceeded alone.

17th March, 1861.—On preparing to start we were informed that a canal, called the "Tai-ping" canal, connecting the Tung-ting lake with the Yang-tsze, would shorten our route by five days. We determined, however, on keeping to the river, in order to obtain all possible information about it.

Kin-ho-kōw.—The river flowing from the Tung-ting lake to the Yang-tsze-Kiang is called "Kin-ho-kōw," or the Mouth of the Golden River, by which name the Yang-tsze was formerly known below this junction, and is so now higher up. Its position at the junction is, by naval dead reckoning from Han-kow, lat. $29^{\circ} 27' 2''$ N., long. $112^{\circ} 50' 05''$ E.

Yo-chow.—Yo-chow, standing at the entrance to the lake, is in the direct road of the trading boats coming from the province of Hu-nan. There does not appear to be much business done, almost all the trade being at Han-kow. The country towards the north-west is flat, being, in March only, a few feet above the water, and covered when the river is in flood: the town is in a dilapidated condition; it stands on high sand cliffs well above the water.

A short distance above the junction the banks are often 18 or 20 feet high in the bends of the river. Opposite these banks are generally extensive flats of sand running far out into the stream: deep water is always found near the steep banks.

The course of the river for some distance above the lake is very tortuous, a whole day's travelling frequently not taking the junk more than 5 or 6 miles in a direct line from the last anchorage.

The country as far as could be seen from the river is a flat, growing wheat, beans, and carrots. In some extensive swamps on the banks osiers were growing. About 30 miles above the lake it becomes undulating, ranges of hills appearing in the west. On the left bank a high and broad embankment protects the low country from the river floods. Before reaching Shi-show, a small walled town on the right bank, the river runs near some hills, varying from 700 to 1500 feet in height. Three of these hills are excellent marks: one we named the "Camel's Hump," another the "Ass's Ears," and the third "Boulder Hill," from a large round mass of rock standing by itself on the side of a hill: all these marks are

visible at a great distance. Higher up the river, close to the town of Shi-show, two hills, called the Little and Great Temple hills, are distinguishable by the white buildings on them for many miles.

Shi-show.—At Shi-show, low hills of a hard red stone run down to the water's edge. From the top of the "Little Temple" hill, close to the river, a good view is obtained of the town and country to the south-east, and of a lake near the town, in which are small islands with houses and gardens. The town is surrounded by a weak-looking wall, and is protected on two sides by the river and lake: the others are commanded by low hills near the walls. Within the town are gardens extending over nearly half the space enclosed by the walls, and this is the case with every town on the Upper Yang-tsze. Nearly all are built at the foot of a slope, the extent of ground enclosed having reference to what a town may one day become, rather than to the available number of inhabitants to defend such a length of wall.

Hohia.—At Hohia, a large village on the left bank, the river makes a sharp bend, and narrows from an average width of 1000 yards to about 700. Through the narrows the stream rushes with great force against the left bank, which, when we saw it, had been deeply cut into. A fine wall of very hard limestone was in course of construction to protect the embankment. In crossing the narrows the lead gave close to the village 14 fathoms, in midstream 16, and $8\frac{1}{2}$ at 20 yards from the right bank. Above the village the embankment recedes from the river until, at the distance of 9 or 10 miles up, it is fully a mile from it. The land between this and the river is about 15 feet higher than on its landward side. It appears to have been built at a time when the river ran in a different bed from its present one. As the river has retired from the embankment to its present channel, the intervening flat has become gradually raised by a succession of deposits of mud brought down by the annual floods, while the country beyond has remained at its original level. A road is carried along the top of the embankment, which is about 25 yards wide.

The carriage of this part of the country is a light cart, generally with two, sometimes with four, solid wheels: buffaloes are used for draught, and small ponies for the saddle. The large-wheeled barrow, the same as that used in the north and in other parts of China, is also found here.

Shahsz', or *Sha-sze*.—About 170 miles above the junction of the Tung-ting lake with the Yang-tsze, is the town of Shahsz'. It is the first place of any importance above Yo-chow, being the port of Kin-chow (fu), a large city a mile inland. Shahsz' is built on the embankment on the river's left, along which it runs for about 2 miles, or rather more. On the whole of its river-face and in

every creek junks, some of a large size, were moored as closely as they could be stowed. A mandarin gave the population as 600,000, but probably more than doubled it. A Chinese will give any answer to avoid the trouble of thinking, and information picked up casually cannot be relied on.

Many West-country boats come down the river as far as Shahsz', bringing sugar, pepper, salt, opium, tobacco, and hemp; taking back cotton and some of the goods imported from Canton, and brought thus far by the Tung-ting lake and the Tai-ping canal, which joins the river 6 or 7 miles above, and to which, when the river is high, there is a short cut opposite Shahsz'.

Kin-chow (fu).—Kin-chow (fu) was said, by the above-mentioned mandarin, to contain 10,000 Tartars, and too many Chinese to be counted: travellers by land reach it in five days from Han-kow. Two thousand men from the Tartar garrison were said to have been sent to Hwang-chow, a town below Han-kow, which the rebels were reported to have taken.

Between Yo-chow and Shahsz' the soundings in the channel were never under 4 fathoms, and varied from that depth to 17, near the banks being seldom under 3. A continuous line of soundings could never be procured, our course being along shore, so that we were only able to get a cast in crossing from side to side.

Tai-ping Canal.—Six or seven miles above Shahsz', the canal before mentioned as connecting the lake and river is passed: it is called "Hu-du-kow" or "Tai-ping," more commonly the latter. Boats come from Yo-chow to the Yang-tsze by it in five days, but make no use of it on the downward voyage, there being little or no stream in it. In fair weather boats go from Shahsz' to the entrance to the lake near Yo-chow in a little over three days. The Tai-ping canal at its junction with the river is about 100 yards broad.

Kiang-kow.—To the west from Kin-chow is Kiang-kow, a town on the left bank, where the country becomes undulating and the river-banks shingly. Just below this town a large fleet of upwards of 200 junks was met, conveying soldiers down to oppose the rebels.

Yang-chi.—Limestone is quarried and burnt and red bricks and tiles made near the village of Yang-chi. From this point the country totally changes its character; from an almost dead level it becomes undulating, hilly, and very shortly mountainous. To the south-west and north-west of the town of Chi-kiang is a range of high mountains, called "Shih-urh-pei" or the Hills of Seven Gates. Peach-trees were in blossom on the side of those nearest the river, while the ground between them and the water was green with wheat and willows. In the distance they appeared well wooded; but there was probably nothing but underwood, no

timber having been seen brought down to the river since quitting the lake.

Chi-kiang.—The town of Chi-kiang stands on the right bank. A battlemented wall runs round three sides of it—that on the river-side, with a large portion of the suburbs, having been laid in ruins by an unusual rise of the river in 1860. The scenery in this part of the river is very fine, and the change most refreshing after the flat country below Yang-chi.

Itu (hien) Chin-kiang River.—Itu (hien), the next town reached, is also walled: it stands on the right bank at the junction of the river Chin-kiang with the Yang-tsze. A range of hills runs to the east, while to the west mountains rise to a considerable height. The sand-flats in the bed of the river are not so numerous as lower down: the banks become clayey and gravelly, while in some places rocks of conglomerate stand out from the shore. Soon after leaving Itu, the course is between vertical cliffs of conglomerate, and the river narrows to 490 yards, from an average of 800 or 900. Reed and rubbish left on bushes and in crevices of the rocks show the rise of the river during the floods to be occasionally 60 or 70 feet above its level in the end of March. Last year it was unusually high. Its rise in June is probably from 40 to 50 feet higher than in the cold months: this will not appear so much when it is considered that the river is here only 50 yards more than a quarter of a mile in width, and at Han-kow, where it is fully a mile, the rise in June was ascertained to be 27 feet, the river being even then rising.

The hills below I-chang are immense masses of conglomerate, not in continued ranges, but standing sometimes singly, sometimes in groups of two or three, and of all sorts of shapes and sizes. Some are flat-topped, others run up into sharp peaks; some are cultivated, while others are too precipitous to hold soil, and on these a few stunted thorny bushes grow. In some are natural caves used as houses and temples; the bases of some are overhung by the tops, and under these, if a stream is at hand, the inhabitants construct huts, merely by building a wall with a doorway from the ground to the rock overhead. From the highest peaks nothing could be seen towards the south, south-west, and west, but confused masses of hills. The valleys are thinly inhabited, and the people we saw looked poor and sickly: they seemed alarmed at our appearance, some taking to flight. Those living near the river suffered severely from the flood of last year, many head of the few cattle they possessed having been destroyed. This year they are said (apparently truly) to be suffering from want of food. Streams of clear water run through the valley, near which the bamboo is extensively cultivated: peaches, pears, cherries, peas, and beans were in blossom, and violets were growing in profusion.

The boats of the lower Yang-tsze ascend no higher than I-chang, and we had here to engage a boat fit for the ascent of the rapids. We anchored for some days off the "Tien-chow" pagoda, a mile below I-chang. The occupation of the men here is principally fishing, the field work being, for the most part, performed by women. Sturgeon (called by the natives "yellow fish") are to be found in this part of the river; porpoises are in great numbers from near the sea until a short distance below the rapids, when they disappear.

I-chang (fu).—The town of I-chang (fu) stands close to the river on the left bank: its position, as ascertained by Capt. Blakiston, is lat. $30^{\circ} 42' 30''$ N., long. $111^{\circ} 29' 0''$ E. It is distant from Shang-hae 950 geographical or about 1100 statute miles; from Han-kow it is 366 geographical or about 420 statute miles. Steam-vessels would find no more difficulty between Yo-chow and I-chang than between Han-kow and Yo-chow. The most easy time to ascend would be when the river is low, as after its rise the whole country below Shishow is so flooded that the banks are not visible, and some difficulty might be found in keeping to the channel.

Most of the trading-junks from Sz'chuan go no farther down the river than I-chang, though many go to Shahsz', and some few to Han-kow. This would be a very advantageous port for trading with the West of China, the difficulties of the navigation above being such as few owners would allow their vessels to risk; at any rate until something more is known of the rapids, and boats of a different construction to any at present in use on the Chinese waters have been built. An immense number of junks were moored along shore when we were at I-chang, and a crowd of them at anchor under the walls on a bank: these latter had on board a number of braves who had been collected to be sent in different directions against the rebels.

To the east and south-east the country is hilly, to the north mountainous. Should this town ever become a trading-port, excellent situations for houses will be found opposite the town on some low hills, and both above and below the town itself on the same side of the river is ample room for building, if it should be thought necessary to have places of business near the native merchants. The town side is not so much raised above the river as that opposite. A mile below the town and at the town itself the river is 940 yards wide in May and June. In the month of March we never found less than $3\frac{1}{2}$ fathoms in any part of the channel between Shahsz' and I-chang. The river begins to rise about the beginning of April, and rises until June: it remains at about the same level until the end of September, and is at its lowest in the month of December, when the water loses its usual red mud-colour and becomes clear. It rose last year about 20 feet above its usual level. Coal is plentiful at no great distance up the

river, but does not appear to be of a very good quality; it is small and dull looking, and is made into bricks, as in the north, before being used as fuel. Still higher up the river there is a district from which both coal and coke (which is made there) could be brought to I-chang by country boats in eight days. This latter coal seems to be of a superior quality.

On leaving I-chang our course was, for about 3 miles, rather to the east of north, when it turned abruptly to the north-west. From travelling on a wide stream, flowing evenly through a slightly hilly country, we suddenly entered a gorge, varying in width from 150 to 200 yards, the current increasing to 5 and 6 miles an hour, with many strong eddies, telling of rocks below the surface. Our lead-line of 25 fathoms found no bottom except close to the sides: the cliffs rise perpendicularly from the water's edge, in some places overhanging the river to a height of from 500 to 800 feet. Cultivation is extensively carried on in these hills wherever there is a sufficiently level space for soil to rest. Wheat, beans, peas, and different sorts of fruit-trees were in blossom high up on the hill-sides.

Tracking the boats in this part of the river is excessively severe work from the broken nature of the ground. The banks are strewn with masses of rock, and men have to be constantly clearing the line. Above I-chang the boats do not use the sculls in use lower down the river; in their stead each boat has from 10 to 20 oars, and, to assist the helm, a long oar is worked over the bow by five or six men. The swirls of the current would twist a boat's head round in an instant, if the men were not ready with this oar to force it in the right direction. The tracking-ropes are made of plaited strips of bamboo, and are very light and strong. The sails of the Hou-peh boats are the same as those used lower down the river, but the boats have one mast only: the West-country boats have light square sails of cotton, with a yard and boom of bamboo, on which they roll up when not set. They are not used on a wind, and have not the cross bamboos usual with Chinese sails: they are generally hoisted on sheers.

A very hard limestone is quarried in these gorges close to the water's edge; holes are cut in the stone, and wedges of soft wood driven in, which, being wetted, swell and split the stone along the line in which they are placed.

About 12 miles above I-chang, at the village of Shantow-pien, the river begins to be obstructed by rapids, that of Pa-tung (sze) being the first met with. When the river is low, many rocks are here above water. In the strong part of the rapid nearly 100 men on the line drew the boat up by inches. Accidents sometimes occur from the towing-line parting. The boats are fended off the rocks by a simple but effective plan: a stout rope is made fast on each

bow, and a spar laid along each gunwale ready for use; but on ordinary occasions the bamboos used for poling in shallow water are made use of. When the boat nears a rock, the pole is projected to meet it, and at the same time two or three turns of one of the ropes made fast to the bow are taken round it. When the pole strikes the rock, the strain is taken by the rope, which, tightening gradually, protects the boat from any shock: these spars can be projected from any part of the boat.

In the gorges of "Lu-kan" and "Mi-tan" the cliffs on both sides rise perpendicularly from the water's edge to a height of nearly 1000 feet. They appear to have been originally one hill split in two by some convulsion of nature: the same marks and strata can be seen on both sides of the river at similar heights. In some places the hills are covered with brown scrub or grass, at a distance resembling heather. Roads are carried across the mountain to the villages in the interior, and are sufficiently good for baggage-animals.

Kwei (chow).—The first town reached above I-chang is Kwei (chow), called Koue on Arrowsmith's map; it is a small walled place on the left bank, containing about 100 houses, and the suburbs about 30. Near the town a good road runs along the river-bank, crossing the ravines on well-constructed stone bridges.

Two miles above Kwei, coal is worked in galleries driven into the hill-sides. This coal does not appear of good quality; it is brought to the surface in small dull-looking lumps. A number of people are employed in breaking it to powder, mixing it with water, and moulding it into bricks for fuel. Boats carry it to I-chang in about six hours.

At the rapid of Yeh (tan), 3 miles above Kwei, the water, in the first week in April, falls about 4 feet in 70 yards, but breaks only near the left bank.

Wu-shan (hien).—The town of Wu-shan (hien) is approached by a long gorge of the same name. About half-way through it are two creeks, one on each side of the river, marking the boundary between Hou-peh and Sz'chuan. That on the right bank is called "Pei-shih," that on the left "Shah-mo-chang." At Wu-shan the poppy is cultivated. On the hills about the town, peaches, apricots, walnuts, the castor-oil plant, hawthorn, honeysuckle, and many wild-flowers grow. A tree called "tung-shu" is extensively cultivated in this part of the Yang-tsze valley. From the nut called tung-tse, an oil used for varnish is expressed; each nut contains three or more kernels, in shape and taste like a small Brazil nut, but very poisonous.

Above Wu-shan the hills recede slightly from the river as far as a gorge, most appropriately named "Fung-siang," or the Wind-box. It averages no more than 80 yards in width; the stream is

strong, but not rapid. The cliffs rise vertically from the water's edge to a great height. At its upper end the hills again recede from the river, and close to a small stream on the left bank stands Kuai-chow (fu).

Kuai-chow (fu).—Kuai-chow (fu) is distant from Shang-hae 1028 geographical, or nearly 1200 statute miles; it is 444 geographical miles from Han-kow, and 78 above I-chang. There appeared no signs of trade in the town, and few boats were lying near it.

Between I-chang and Kuai-chow the navigation would be difficult and dangerous. When the river is high, small, powerful steamers of light draught might ascend the rapids, but the safest plan would possibly be to tow them up. Of these rapids there are eight, though some are called so merely from the water running rapidly over a shallow near one shore; while near the other the stream is deep and still, running, perhaps, 7 miles an hour. The largest country-boats ascending are about 120 feet long, by 15 broad; drawing, when loaded, under 3 feet. They come down without difficulty, merely by keeping in midstream, the channel being apparently free from obstructions; and should the commerce of the Upper Yang-tze present sufficient advantages to compensate for the risk attending the navigation of this part of the river, steamers will doubtless be taken up and down in safety. It is difficult for a military officer to give an opinion on such a subject, but the obstacles appear to me by no means insuperable. At a short distance from the shore the water is deep, and the object of having vessels of light draught is to enable them to come close to the side, and to prevent the current from taking so much hold of them. Any number of hands are always procurable at the rapids; men living there whose business it is to assist boats on their way up, and among whom good pilots would certainly be found. It would not be easy to anchor in all places, on account of the rocky nature of the bottom and the depth of water, but many sandy bays are to be found where a vessel would lie snugly.

Land-route to Ching-tu.—The road from Kuai-chow to Ching-tu was reported impracticable for baggage-animals; the regular road strikes across from Wan, a town a short distance up the river. The authorities at Kuai-chow had heard of the existence of a treaty between England and China, but had never seen a copy: the Prefect was supplied with one by us.

Mexican dollars had been readily taken on the river as far as I-chang, at 1000 cash each. At Kuai-chow, having no more dollars, Sycee silver was exchanged at 1720 cash per tael; but the Sz'chuan, Han-kow, and Shang-hae weights differ in the following proportions:—100 Sz'chuan taels = 101·6 Shang-hae taels; 100 Sz'chuan taels = 102·48 Han-kow taels.

Wan was said to be 360 li, or about 110 miles, above Kuai-chow.

In this part of the country a day's march, whatever its actual distance, is called 100 li; and the li may therefore be taken as a measure of time, rather than of distance. In this instance we were rather over 3 days in reaching Wan, but the distance is under 60 miles.

Between Kuai-chow and Wan the river is nowhere less than 150 yards in breadth. There are some rapids, but none so strong as those in the gorges below Kuai-chow; there are also rocks and reefs, but plenty of water in the channel. The hills recede much from the river, and are not so high as those lower down. The poppy is cultivated, the opium being collected during April and May. The seed-pods of the Sz'chuan poppy are quite as large, and in many places larger, than any I have seen in India. The specimens of opium brought down have been pronounced good, and the quantity produced in the province is so great that it may well interfere with the foreign market.

Shortly before reaching Wan are some flats of sand and shingle, on which gold is washed for; but the quantity produced is small, and none but those who can find no other occupation are employed in the work.

Wan (hien).—The town of Wan (hien) stands on the left bank. It is a small walled place; the shops are well supplied, and the inhabitants well off. Coal, sulphur, ginger, sugar-cane, spices, and blue cotton-prints were exposed for sale. The hills about the town are well watered, and produce, besides the poppy, tobacco, peas, beans, wheat, and barley; rice and cotton follow later in the season. The tungshu-tree is also much cultivated.

Numbers of soldiers were on their way up the river towards the West, and we found here a Tartar general, to whom the Viceroy of Hou-peh had given us letters: he was civil and attentive. All along our route we had heard that Sz'chuan was in an unsettled state, and the General confirmed the report. He had come to Wan to make dispositions of troops, and, having done this, was hastening from the rebel proximity. He reported the insurgents to be in possession of many towns between Wan and Ching-tu, and the land-route to be impassable on that account. He said the people had been so plundered themselves, that they had taken to robbery as a means of existence; and that it would be impossible to obtain carriage, as no one would be induced to venture into the disturbed districts. The Prefect, whom we afterwards visited, told the same story, and recommended our going by water to Chung-king, which we were obliged to do. He had copies of the treaty, which he called that of Prince Kung: it was not seen posted anywhere.

About 6 miles above Wan the ranges of hills become less rugged, the river being about half a mile wide; farther on gold

is washed for on the shingly flats. The river is bordered by many precipitous rocks, but they do not rise from the water's edge.

Hu-lin Native Christians.—At the village of Hu-lin we found some native Roman Catholics. They appeared delighted to see that foreigners were travelling about the country without even disguising their dress, and with no attempt at concealment; they complained that the authorities treated them badly, and that not long since they had raised a mob on them, who had burnt and plundered their chapel. Our arrival was made the occasion of a general holiday; we were invited to a feast, and salutes and crackers fired in our honour.

Before reaching the town of Chung-hien the river is tortuous, varying in breadth from 200 yards to three-quarters of a mile. In the narrow part the stream is strong, but in the channel is nowhere broken into rapids. About 25 miles above Chung are many rocks in the river, some of which in the middle of April are about 5 feet above water, others just visible, and probably others hidden; later in the season these would all be covered, and the navigation would be difficult without a good pilot. Men who know the river well are to be found in all the towns. The crags by the river-side and the hills would afford marks by which a pilot would know his situation.

Above Wan, with wheat, barley, and peas, the poppy and tobacco were everywhere seen. At an island named "St. George's Island," from the day on which we passed it, the island itself and the whole surrounding country, to the tops of the highest hills, were covered with it; and from this place to Chung-king, a distance of about 76 miles, with the exception of a few patches of wheat and tobacco near the villages, nothing but poppy was grown as far as could be seen on both sides of the river. The crop is over by the end of May, and is immediately followed by sugar-cane, Indian corn, and cotton. In the poppy districts rice was growing only near the villages.

From the entrance to the gorges above I-chang, the scenery is very grand; here the appearance of the country is very fine, though not so imposing as below Kuai-chow. The villages and their inhabitants were, when we saw them, very superior to those lower down the river, though they would present the same wretched appearance after a visit from the rebels. The dress of the people is the same, but they look better off, and the farmhouses and others are better built. They stand among clumps of bamboos and fruit-trees; each detached house having its own garden, surrounded by a fence. There is a greater appearance of comfort here than in any part of China I have seen, but the universal reservoirs of liquid-manure forbid a close inspection.

Kung-tan-ho.—At the town of Fu (chow), on the right bank,

the river Kung-tan-ho falls in. It is said by the boatmen to be navigable for some distance above its mouth, and to be one of the routes by which traffic is carried on between Canton and the west of Sz'chuan. Redoubts of masonry have been built on four high peaks near its mouth.

Below the town of Chang-show (hien), on the left bank, a small clear river joins the Yang-tsze; near its mouth are many rocks, reefs, and shoals, but deep water is found near the right bank.

In all the districts above Chang-show the country people have banded themselves together against the rebels. The rebels in the West all go by the name of "Tu-feh," or local robbers, and are in no way connected with the "Tai-pings" of Nankin. They are both called "Chang-mao," or Long-hairs; but the Tu-feh cut off the queue, which the Tai-pings retain, in case of falling into the hands of the mandarins.

Limin.—A narrow gorge leads round a bend of the river to Limin, a walled town on the left bank, separated only from Chung-king by the river Ho-tow, or Ho-kiang. Along the whole front of both these towns and in the Ho-tow river, numbers of both large and small junks were either at anchor or moving about. There was every sign of a great amount of business being carried on.

Chung-king (fu).—Chung-king (fu) is most admirably situated for a trading-port, being at the mouth of the Ho-tow, coming from the north of Sz'chuan. About 120 miles farther up the Yang-tsze the river Fusung falls in also from the north; 80 miles above this the Min (ho), coming from the north, joins at Su-chow, the river being connected with Ching-tu (fu), the capital of the province, by a canal. The Ho-tow is navigable for large junks as far up as the town of Chun-king, and probably higher when the river rises. Articles of merchandise, such as silk, wax, and hemp, come principally from the districts near Kia-ding, on the Min, from which place they are shipped. These districts are now in the hands of the rebels, Kia-ding being their headquarters, so that trade with that side of the country is at a standstill. The great objection to Chung-king as a port open to foreigners is the state of the river between it and I-chang. Above Kuai-chow the navigation is comparatively easy, but 80 miles of dangerous ground would have to be passed above I-chang. From Kuai-chow to Ping-shan, properly constructed river-steamers could easily ascend; but as no trade is at any time carried on above Su-chow, there would be little inducement to go beyond that town. Chung-king is the depôt for the whole commerce of the West, and is the largest and most flourishing city in the West, being of greater extent and population than the capital of the province. None of the buildings have the tumbledown appearance so common in many Chinese towns. A stone wall, said to have 18 gates, surrounds it; it is built close to

the river. Opposite the town, on the right bank, is an extensive shoal of shingle, but good anchorage would be found near the walls and in the Ho-tow. Captain Blakiston's observations place the "Tai-ping mun," one of the water-gates, in lat. $29^{\circ} 33' 8''$ N., long. $106^{\circ} 50'$ E. It contains, according to the statement of some French missionaries resident here, a population of 200,000, of whom between 2000 and 3000 are Christians, and 500 families Mussulmans. In Ching-tu there are said to be 1000 Mussulman families.

The Toutai of Chung-king was not inclined to be civil, and the French missionaries warned us that the soldiers intended to murder us. A very sharp letter was sent to the Toutai, in which he was warned that the responsibility would rest with him if any Chinese lost their lives, which they would most assuredly do if they attempted to molest us; after this he became very civil, and we were received at his yaman with all honour. The soldiers had to be shown that they could not insult every one with impunity, but we were fortunately not obliged to use our firearms.

Besides the three rivers already alluded to by which merchandise is brought to the Yang-tsze, several small ones come in from the province of Kwei-chow; but of these I am unable to give any information.

The following statistics of the trade of Chung-king are from the information of a Chinese merchant:—

EXPORTS.

		Taela.
Raw silk	per catty,	2.4.4
White insect-wax	"	0.3.1
Ditto before the time of the rebels	"	0.2.8
Bees' wax (scarce)	"	0.2.5
Hemp (for grass cloth)	"	0.0.9
Medicinal drugs, price unknown.		
Hung-qua (safflower) for dyeing, price unknown.		
Rhubarb (bad)	"	0.1.3
Sieh (tin or spelter)	"	0.2.8
Lead (from Yun-nan)	"	0.1.0
Salt	"	0.0.3
Sugar	"	0.0.5
Tobacco	"	0.0.7

Copper is brought from Yun-nan, and iron from the district of Lan-shwan-hien 300 li to the S.E.

[Note.—The metals from Yun-nan are re-exported to the Eastern Provinces.]

Coal (best quality) not much exported	per picul,	Cash. 300
Silver	per tael,	1,500
Gold	"	Taela. 16.0.0
Rice (said to be little exported)	per picul,	2.5.0
- (The above were given as wholesale prices.)		

	Cash.
The freight on silks, drugs, &c., from	
Chung-king to I-chang is per picul,	1-0-0
On coarser articles "	0-3-0
The duty on silk was believed by the	
informant to be "	3-0-0

Silk embroidery is worked in the town, and a coarse silk manufactured.

The following list is of specimens purchased in Hung-king, and their wholesale prices, as given by a native writer attached to the party, are set down opposite each :—

	Cash.
Opium per tael,	380
Insect-wax per catty,	400
Sieh (tin or spelter) "	390
Copper "	240
	Tael.
Rhubarb per picul,	8-0-0
Chuan-pè-ma (a drug) "	75-0-0
Hung-qua (safflower) "	32-0-0

Coal and limestone are brought in considerable quantities along the great Eastern road, and across the river by a ferry to the Taiping gate; this is carried up the hills by a flight of stone steps six feet wide; the road for some miles inland is paved.

IMPORTS.

	Tael.
Tea (best quality) from Hou-nan .. per picul,	50-0-0
Ditto (No. 2) "	16-0-0
Ditto (inferior) grown in Sz'chuan .. "	3-3-4

Freight from I-chang to Chung-king is less than from Chung-king to I-chang. Foreign goods are now brought from Canton *via* the Tung-ting lake; before Su-chow in Kiang-su was taken by the rebels, the route was from that town *via* the Yang-tsze.

The following is a list of foreign cloth goods imported from Canton. The figures prefixed to the colours signify the proportion in which each is in demand, 1000 being the maximum; the Chinese names are in parentheses.

Foreign Cloths.

(Piki) Long Ells.

	Tael.
1000 Scarlet per piece,	11-0-0
150 Dark-blue "	9-8-0
150 Light-blue "	8-8-0
100 Black "	8-0-0
80 Green "	10-5-0
50 Foreign-blue "	10-0-0

(Yu-mäü) Dutch Camlet.

100 Dark-blue per piece,	30-0-0
80 Sky-blue "	28-0-0
10 Black "	19-0-0
10 Scarlet "	27-0-0
10 Foreign-blue "	25-0-0
5 Green "	22-0-0
5 Pale-yellow "	25-0-0

(Yu-sho) English Camlet.

		Taels.
100 Dark-blue	per piece,	28.0.0
80 Sky-blue	"	18.7.2
10 Black	"	17.4.0
10 Scarlet	"	25.3.0
10 Foreign-blue	"	23.3.0
5 Green	"	19.8.0
5 Pale-yellow	"	23.5.0

(Ki-tow) Fine Cloth.

100 Dark-blue	per piece,	10.3.0
60 Sky-blue	"	10.2.0
10 Scarlet	"	10.2.0
10 Foreign-blue	"	10.2.0
5 Brown	"	10.1.0
5 Black	"	10.1.0

(Ma-kien) Common Cloth.

100 Dark-blue	per piece,	10.4.0
50 Sky-blue	"	10.3.0
10 Scarlet	"	10.3.0
10 Foreign-blue	"	10.3.0
5 Brown	"	10.2.0
5 Black	"	10.2.0

(I-cho-ni) Broadcloth.

20 Black alone used	per piece,	20.0.0
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(Yu-ling) Lastings.

20 Dark-blue	per piece,	16.0.0
100 Sky-blue	"	17.0.0
100 Foreign-blue	"	17.0.0
20 Black	"	15.0.0

Cotton Goods (packed in boxes of 20 pieces).

		Taels.
White prints	per piece,	3.7.0
Coloured ditto	"	4.8.0
Checks	"	4.4.0
White calico (1st quality)	"	3.6.0
" (2nd quality)	"	3.4.0
" (unbleached)	"	3.3.0
Printed chintz	"	2.5.0

Sundries.

		Taels.
Brass buttons	per gross,	3.2.0
Telescopes	each about,	10.0.0
Pistols	"	4.0.0

No carriage was procurable at Chung-king, the country between it and Ching-tu being full of rebels; so we had to proceed by water to Su-chow.

Kiang-tze (hien).—The first town reached above Chung-king is Kiang-tsze (hien). The current runs about 4 miles an hour, and rapids occur. The river, from passing through such a hilly

country as the province of Sz'chuan, is liable to sudden freshes, every thunderstorm in the hills pouring a large body of water into it; it falls nearly as rapidly as it rises. Flats of shingle are washed for gold, as below Chung-king. Coke is used for fuel, and coal and limestone are dug near the village of Yo-chi.

Above Chung-king none of the boats use sails, and dispense with the steering oar used for assisting the helm in the rapids. Boats with salt and merchandise were continually passing down, and bales of cotton being carried up on rafts formed of bamboos; a number of oil-boats were also passing down.

Above Chung-king the poppy crop was over, and sugar-cane and Indian corn were being planted in its stead, at the same time that rice was taking the place of wheat and barley. Buffaloes (many of a pink colour) are the only animals used in farming operations.

Ho-kiang (hien).—At the town of Ho-kiang (hien) a small river, called Zhun-huei or Chi-shui, rising in the province of Kwei-chow, falls into the Yang-tsze. In this district the safflower is extensively cultivated, and a species of hemp is grown both here and at Chung-king.

Lu (chow).—The river Fu-sung joins the Yang-tsze at Lu (chow) (called Che-li-leou on some maps). This river passes about 30 miles to the east of Ching-tu, and, at the time we passed, the country through which it flows was held by the rebels. It is one of the roads to Ching-tu. At Lu, a great number of spars, apparently of fir, were stacked.

Na-chi (hien).—At the town of Na-chi (hien), the appearance of the farmhouses and villages changes for the worse; the people look poor, forming a great contrast to those a short distance below. This district was visited last year by the rebels, which may account for the wretched appearance of the inhabitants. The river Yun-lin here falls in from the south. Below Na-chi several reefs and shoals occur in the river, but the channel appears clear, and there is plenty of water. The breadth of the stream opposite Na-chi is 660 yards.

Kiang-an (hien).—The river An-lui-kiow, flowing from the south, falls into the Yang-tsze at the town of Kiang-an (hien). The country is hilly, the hills well watered, and extensively cultivated with rice. The people were in a great state of alarm about the rebels; on the hills many new redoubts had been constructed, and men were on outpost duty on the river in boats.

Nanki (hien), Li-chuan-pa.—From the town of Nanki (hien), hills can be seen in the interior rising to a great height. A short distance above Li-chuan-pa, a small town, coal is worked.

Su-chow.—Su-chow is a large town on the left of the Yang-tsze and right of the Min-kiang, which here falls in from the north. It is at all seasons navigable for large junks as far as Kia-ding, a town about

100 miles from its mouth; and when the water is high, up to Ching-tu, a canal having been cut from the river to the town. When the water is low, the communication above Kia-ding is kept up by means of small boats.

The navigation of the Yang-tsze from Chung-king to Su-chow would not be difficult for steam-vessels; there are rocks in places, but seldom under 8 fathoms water in the channel, and near the sides rarely under 3. The average rate of the stream in this part of the river is perhaps $5\frac{1}{2}$ miles an hour.

Su-chow (fu).—Su-chow (fu) is a large town, at which in quiet times a large amount of trade is probably carried on. A great number of junks were waiting here, in the hope that the banks of the Min river might be deserted by the rebels, so as to enable them to proceed to Ching-tu or Kia-ding, which place was held by them. They were said to have detached parties much nearer Su-chow, and to be robbing and murdering every one they could lay hands on; headless bodies, with their hands tied behind their backs, floating down the Min at all hours, plainly showed that there was some truth in the stories we had heard on our way up. The gates of the town were closed, and there were no means of ingress or egress but by a rope over the walls. A strong garrison of braves from Sz'chuan and Yu-nan were quartered outside the city, and fighting among themselves. An engagement took place between them during our stay, and the Yu-nan party had to be removed by the authorities. On our return they attacked our boats with stones, but the sight of the rifles, &c., put them to flight. The position of Su-chow, according to Captain Blakiston, is in lat. $28^{\circ} 46' 6''$ N., long. $104^{\circ} 35'$ E.

The products of the neighbouring country are yellow and white silk, insect-wax, bees'-wax, tobacco, honey, coal (220 cash per picul), a small quantity of iron, which is worked close to the town, and green tea. Sycee was worth 1630 cash per tael.

No one could be found to accompany us through the rebel districts to Ching-tu, and we had therefore to ascend the river to Ping-shan, in the hope of being able to get round them. The only traffic above Su-chow is in coal, which is brought down in boats; above Ping-shan no trade at all goes forward.

The country above Su-chow is very mountainous, and the river decreases in width; its average is about 200 yards. Twenty miles above the town it runs through a district in which coal is extensively worked, being dug out in galleries high up on the hill-sides, and sent down in baskets sliding on stout ropes of bamboo, a full basket drawing up an empty one; these galleries are often at such a height that a half-way stage is necessary. This coal district extends for 17 or 18 miles along both sides of the river. The coal

appeared to be of a superior quality to any seen below; it was brought out in large and bright lumps. In every place where coal was seen the rock was sandstone, and where washed by water was jet black and polished. Boats would carry coal from this district to Han-kow in 20 days, to I-chang in 10. Many men here have brown hair; this is not seen lower down the river.

Above Su-chow the geographical name of the Yang-tsze is the "Kin-cha-Kiang," or River of Gold; it is called by the boatmen merely the Yu-nan River. Nothing could be learnt about it above Ping-shan, but there are said to be falls at a distance of 100 li above. Our boatmen and captain refused to go farther, and would not proceed beyond Su-chow until we promised to take them no farther than Ping-shan.

Ping-shan.—Ping-shan, a small walled town on the left bank, is the farthest point to which we ascended. No Europeans, as far as is known, have ever reached this point before us. The walls have lately been put in a state of repair, and strengthened on the landward side by traverses constructed on the banquette, as the hills close to them completely command them and expose them to an enfilading fire. The prefect was here at first very civil, and promised all assistance, but said the rebels were in the neighbourhood and that we had better leave the place. The townspeople closed the gates and fired on us from the walls, but no bullets came anywhere near us, and, finding we remained quiet, they discontinued. That same night the rebels attacked the town; the walls were illuminated, and every man of the attacking party carried a lantern. The fighting did not appear to be very severe, being confined to distant firing and shouting.

Except for purposes of exploration there is nothing to bring a steam-vessel beyond Su-chow; the river is navigable as far as Ping-shan, with the exception of the 80 miles between I-chang and Quai-chow, and even that may be practicable. Above Ping-shan I can give no information about the river; but from the tops of the highest hills near the town nothing can be seen but high hills towards the west.

Maoutse.—From this point we were compelled to turn back, no one being willing, for any amount of pay, to venture into a district overrun by rebels. No boats ascend the river beyond Ping-shan, so that we were unable to visit the country of the Maoutse, or independent tribes, which is near Ping-shan to the west. A chief of these tribes, with some of his followers, paid us a visit, and were very friendly; we exchanged presents of knives and wine. They are a totally different looking race to the Chinese; their faces being open and honest, which the Chinese certainly are not. Some had the head clean shaved, others let their hair grow, and

one only had a queue. The weather was warm, and their dress consisted only of a coarse white cotton jacket, drawers, and grass sandals; their turbans were of blue cotton, twisted into a knot above the forehead. They called themselves "Huh-I" or "I-jin," black barbarians or foreigners, and repeatedly said they were not civilised men. They were very curious, and inspected everything in the cabins narrowly, but were perfectly well behaved; the chief spoke a little Chinese, but none of his followers could make themselves understood. We were considered by the people to be in some way connected with these people, and were called by them "White Maoutse." None of the Maoutse could read or write; they possess horses and cattle in their own country; they said their only crop was Indian corn. The chief said, if we came to his country there would be no difficulty about carriage, but we should have a mountainous country to cross before reaching it, and there was no possibility of procuring carriage at Ping-shan; he said that travellers would be plundered by the tribes, unless under the protection of a chief. It was impossible to make out the limits of their country, but its western boundary cannot be far from the frontiers of Burmah and Assam.

The country round Ping-shan is hilly and fertile. Silk is produced in considerable quantities; Indian corn, rice, sugar-cane, and turmeric are cultivated on the hills, and the cactus grows to a large size; water-snakes and eels caught in the rice-fields are eaten by the boatmen and villagers.

The boundary of Yu-nan is passed just below Ping-shan, though we could not clearly ascertain where; the country on the south bank of the river opposite the town was said by the prefect to be in that province.

Capabilities of the Country.—On both sides of the river, the whole way from Yo-chow, and even from Han-kow to Ping-shan, the country is destitute of cattle, with the exception of a few sheep and goats at Yo-chow and goats in some places; buffaloes and ponies were seen at times, but their number is small, nor does the country appear thickly populated. Should an expedition, hostile or otherwise, ever ascend the river, the whole of their supplies would have to be carried with them. A few fowls, eggs, fish, and a considerable amount of flour, salt, and vegetables would be procurable; the towns would accommodate a large number of men, but few places are fit for encamping, the ground near the towns being covered with grave-mounds; the hills above Han-kow have been before alluded to. The people generally burn charcoal, except in the coal districts. Firewood is grubbed up about the country and brought in boats to the towns; there would be difficulty in obtaining it in large quantities.

The people are, wherever we met them, a quiet, inoffensive race; but as the rebels increase in numbers, they find it necessary to combine for their own safety, the Government giving them no aid. In fact, whenever the Imperialist troops are in the field against the insurgents, the people are worse off than when left to protect themselves, being plundered by both parties. In the districts above Chang (show) hien they are keeping the rebels off, and have outposts on the river, lookout stations on the highest hills, and redoubts in the most defensible situations. No artillery larger than a jingall is used in this hilly country, and it is only necessary to construct the redoubts so that they may be safe from escalade. If the Chinese Government had the least energy, the rebels would have no chance to establish themselves in a country where the popular feeling is so strong in favour of law and order; but should the present state of affairs continue much longer, the feeling of the population will probably undergo a change. Finding the Government powerless to protect them, they will lose their respect for it, and the habit of carrying arms will make them less likely than formerly to submit to the exactions of the authorities. Being by nature industrious and peaceable, they are the people of all others likely to make good and loyal subjects to a government strong enough to ensure them peace and quietness. Many of the rebels have become so either from necessity or compulsion, and would gladly embrace an opportunity of returning to a quiet life: among them would doubtless be found men who, with officers in whom they could trust, would make first-rate soldiers.

The rebels in the West have no connexion with the Tai-pings, but have sprung from bands of robbers, doubtless encouraged by the weakness or want of energy of the Government; the provinces of Sz'chuan and Yu-nan have always been in an unsettled state, being infested by numerous bands of robbers. About two years ago, four of their leaders, by name "Lan-ta-shun," "Li-chwan-tata," "Chang-ü-mats," and "Mou-san-chow," collected larger numbers of men than usual, and, uniting their forces, have since that time set the Government at defiance; at the present time they occupy a large portion of the province of Sz'chuan, and are said to have burnt the suburbs of the capital, Ching-tu (fu), and to be besieging the city. These bands first became formidable in the ninth year of the reign of the present Emperor, "Heen-Fung." On the authority of a mandarin who commanded our Chinese escort, they are now occupying the following towns in Sz'chuan between Wan (hien) and Ching-tu:—Ping-chi, She-kung, Chung-kiang, and Shun-king; between Chung-king and Ching-tu:—Ho (chow), Ting-yuen, Mien (chow), Nan-ching, and Si-chung; between Lu (chow) and Ching-tu;—Niu-fu-tu, King-yen, and We-

yuen; between Su-chow and Ching-tu:—Kia-ding, Kien-we, Yow-ku-tu, Kioh-kih, Manien-chang, and Utung-kiow. The sons of a moulvee at Chung-king gave the following as the names of places occupied by them in Sz'chuan:—Mé (chow), Sintu, Mien (chow), Kin-shu (hien), Pun-shan (hien), Kien (chow), Kwan (hien), Ho (chow), Ting-yuen, and Sueling (hien); several names in the two lists corroborate each statement. From a Chinese map in the possession of the prefect of Ping-shan many places to the west of any of the above-named either had been or were at the time in the hands of the rebels; after getting all they can out of one town, they often leave it and move to another.

Part of the Mussulman population of Yu-nan is also in insurrection, under the leadership of a Hadji, by name "Ma Yussu;" his headquarters are at Ta-lif (foo), in the west of the province, and on the high road leading from the Burmese frontier to Yu-nan, the capital of the province, and to Ching-tu (fu), the capital of Sz'chuan.

China, to the south and west, may be said to be out of the hands of the Government; though the mandarins still govern some towns and districts, they are ready to take to flight on the first attack of the rebels. The military commandant of Ping-shan was reported to have done so with his garrison as soon as the town was attacked, and was considered to have acted quite properly. As far as the safety of the town was concerned, he did, no doubt, the best thing possible; for the rebels would, in all probability, have been admitted by some of the soldiers.

Trade is in the West almost at a standstill, and it would seem of little use to open ports up the river for trade with that part of the country until the rebels have been put down. I-chang is the only place at present where trade might be carried on with advantage, and the prospect of it might assist in settling the western provinces; the rebels there are not the same fanatical savages that the Tai-pings are; they do not destroy for the sake of destroying only, though in attacking a town they will burn buildings that interfere with their operations. Many of these men would undoubtedly be glad of a chance to escape from their present life, and the opening of trade with the foreigners would give them an opportunity of doing so.

A body of the Tai-pings, under a leader called "Shih-ta-kai," is said to be in the province of Kwei-chow, and this seems to be the most westerly point to which they have penetrated. On our way down the river we found a large Imperialist camp at Yo-chow, from which the rebels were said to be 180 li distant. They were also reported to be 30 li from King-kow, a town on the right bank a short distance above Han-kow; but until the floods subside

they cannot move much about the country in the vicinity of the river.

The mandarins, as far as we could see, threw no obstacles in the way of our expedition. Excepting at Chung-king, we were everywhere most civilly received; the authorities were curious to know what we were really about; the mandarins and soldiers sent with us, though ostensibly a guard of honour, were more probably for the purpose of reporting on our proceedings; and it is probably well known, long before this, at Peking, that the river has been surveyed and soundings taken as far as Ping-shan. I attribute our failure to penetrate into Tibet to no hostility on the part of the authorities, but to the impossibility of obtaining people to accompany us through a country where they had a very good chance of having their throats cut. The viceroy of Sz'chuan is the governor of Tibet, and is said to be well affected towards foreigners; he is a brother of the new Minister for Foreign Affairs at Peking, and resides at Ching-tu.

Overland Route through Burmah.—Some time back there was some talk of attempting a route into Western China by Burmah, but the Yang-tze seems to me to be the preferable route in every way: it is most likely navigable for country boats a long way above Ping-shan, and the conveyance of goods by land across such a hilly country as Yu-nan would be difficult and expensive.

As we descended, we found the river very much risen since we passed up. In the gorges below Kwei-chow the rapids had almost disappeared; two bad places occurred below Shan-tow-pien, but no others. The stream ran, except in these places, 6 and 7 miles an hour.

Below Shi-show the river-banks were much flooded, and it would be difficult, when the river is high, for ships to keep in the channel, there being nothing to mark the bank. Looking towards the Tung-ting lake there was a clear horizon, the view being broken only by trees and half-submerged villages standing out of the water.

I regret being unable to add more to the very slight knowledge possessed of the Interior and West of China. Whenever the rebels are put down, and not till then, a great amount of trade ought to be carried on with the West, and our knowledge of this most interesting country will increase. Under a good government the Chinese may become as fine a nation as any under the sun; but, as far at least as the West is concerned, we must for the present rest satisfied with the little that is known of them.

REGISTER OF THERMOMETER.

Date.	Sunrise.	8 A.M.	Noon.	5 P.M.	REMARKS.
March 17	53	53	53.5	53.5	Cloudy with rain.
" 18	50	54	..	55.5	Foggy and sultry.
" 19	49.5	56	64	59	Heavy dew, fine.
" 20	57	57	57	54	Cloudy with rain.
" 21	48.5	52	58	52.5	Cloudy.
" 22	47	51	..	52.5	Cloudy and clear.
" 23	48.5	56	63	57	Cloudy.
" 24	54	58	65	62.5	Cloudy.
" 25	59.5	59	58	50	Overcast, rain.
" 26	..	46	50.5	48.5	Thick with rain.
" 27	46	47.5	53	54	Overcast.
" 28	50	54	66	59	Clouded over.
" 29	54.5	55.5	57.5	58.5	Cloudy with rain.
" 30	47	48.5	53	52	Cloudy with rain.
" 31	49.5	51	57	55.5	Clouded over.
April 1	55	58.5	68	65	Clear and cloudy.
" 2	47	53.5	67	58.5	Misty and cloudy.
" 3	60	64	..	62.5	Cloudy.
" 4	60	62.5	69.5	63	Clouded over.
" 5	58.5	..	61	62	Overcast and rain.
" 6	59	58	..	59.5	Cloudy with rain.
" 7	58	60.5	68	60	Cloudy with rain.
" 8	56	63.5	70	68	Cloudy.
" 9	59	..	71.5	74	Cloudy.
" 10	64	63.5	65	66	Cloudy with rain.
" 11	64	65	70.5	69	Clouded over.
" 12	..	65.5	64.5	63.5	Cloudy with showers.
" 13	..	62.5	62	58.5	Cloudy with rain.
" 14	56	59.5	67.5	..	Clear and cloudy.
" 15	57.7	62.5	71.5	61.5	Cloudy and clear.
" 16	56	64	71	68	Cloudy.
" 17	60	63	71	65.5	Foggy and hazy.
" 18	62.5	66.5	71.5	66	Hazy and thunder-clouds.
" 19	62	66	76	70	Cloudy and hazy.
" 20	65	70	77.5	76	Overcast and hazy.
" 21	71	73	79	68.5	Cloudy with rain.
" 22	66	68	72	68	Cloudy, heavy rain.
" 23	65	67	74.5	73	Foggy and clear.
" 24	64	68	82	75	Clear.
" 25	66.5	72	86.5	78.5	Clear.
" 26	71.5	76	88	87.5	Cloudy and clear.
" 27	76	83	88.5	71	Cloudy with rain.
" 28	70	71	80	74	Rain and clear.
" 29	68	71	73.5	67.5	Rain and overcast.
" 30	66	68	..	73.5	Cloudy and clear.
May 1	67	69	80.5	..	Clear and hazy.
" 2	68.5	73.5	81	76	Clear.
" 3	69	77	92.5	78.5	Clear, oppressive.
" 4	73.5	79	88.5	81	Clear, oppressive.
" 5	74.5	80.5	90	84	Cloudy, raining, very oppressive, lightning to S.W. and N.W.
" 6	77.5	79	85	80	Cloudy.
" 7	74	77.5	84.5	73.5	Cloudy, thunderstorm.
" 8	74	72	67.5	67.5	Cloudy, heavy rain.
" 9	..	69	77.5	71	Rain, cloudy.
" 10	68.5	68.5	69.5	67	Overcast, rain.

REGISTER OF THERMOMETER—continued.

Date.	Sunrise.	8 A.M.	Noon.	8 P.M.	REMARKS.
May 11	68	73	79	76	Cloudy with fresh wind from N. to E., with heavy rain and thunder at night.
" 12	70	63.5	65	64	Steady and heavy rain.
" 13	65	69	74	68	Clouded over.
" 14	63	64	67	67	Thick and cloudy.
" 15	63	64.5	..	67	Rain and cloudy.
" 16	65.5	68.5	77.5	70	Overcast, cloudy.
" 17	70	73	82.5	73	Cloudy.
" 18	69	..	84	80	Cloudy and hazy.
" 19	73	..	..	82.5	Light clouds.
" 20	73.5	74	78	68.5	Cloudy and showery.
" 21	69.5	76	78	76	Cloudy.
" 22	70	72.5	79.5	78	Cloudy.
" 23	74	80	86.5	83.5	Cloudy.
" 24	78.5	81	90	71.5	Cloudy with rain.
" 25	..	71	79	74.5	Rain and cloudy.
" 26	70.5	78	84.5	76	Overcast, strong rain.
" 27	72	74	77.5	70	Overcast, strong rain.
" 28	71	76.5	84.5	77.5	Clouded over.
" 29	..	71	81.5	77	Heavy rain, cloudy.
" 30	..	73.5	77.5	74	Cloudy, heavy rain.
" 31	67.5	69.5	80	73	Cloudy with rain.
June 1	67	72	78.5	73.5	Cloudy.
" 2	71	76	72.5	71	Steady rain, cloudy.
" 3	67	69	69.5	69.5	Rain, thick weather.
" 4	68.5	68	68	67	Incessant rain.
" 5	67	71	75.5	75	Clouded over.
" 6	71	73	76.5	74	Foggy and cloudy.
" 7	69	76	84	76	Hazy and cloudy.
" 8	72.5	76	83	77	Thick mist, cloudy.
" 9	75	76	79.5	76	Hazy and cloudy.
" 10	72	76.5	79	80.5	Cloudy and close.
" 11	74	77.5	83	72.5	Cloudy, squally from S.W. with thunder, rain all night.
" 12	71.5	71.5	74	70	Cloudy with rain.
" 13	68	74	79	75	Clear and cloudy.
" 14	71	76	86	81	Cloudy (Therm. exposed, 116°, river water 73°).
" 15	72	75	85	77	Clear, close and sultry.
" 16	76	81	88	76	Cloudy, thunder.
" 17	..	81	88	81	Cloudy (after Therm. 90°).
" 18	75	81	91	82	Cloudy, rain at night.
" 19	75	82	93	68.5	Cloudy with rain.
" 20	64	72	70.9	69	Heavy rain, cloudy.
" 21	..	71	80	72	Cloudy (river water 74°).
" 22	71	77	91.9	77	Clear and cloudy.
" 23	76	80	84	79	Clear and cloudy.
" 24	79	82	85	82	Cloudy.
" 25	75	76	78	76	Cloudy.
" 26	76	79	82	80	Cloudy.
" 27	78	87	81	68	Cloudy with rain, during afternoon strong gale from N.W. to W. by N.
" 28	60	72	..	..	Cloudy.

II.—*Notes on the Yang-tsze-Kiang, &c.* By Dr. ALFRED
BARTON, F.R.G.S.

Read, March 24, 1862.

OUR little band was composed of Lieut.-Col. Sarel, 17th Lancers; Capt. Blakiston, R.A.; and myself, with attendants; Rev. Mr. Schereschewsky, our interpreter; four Sikhs of the 11th Punjab Infantry, and four Chinese servants. Our intended route was to follow the course of the great river of China as far as Wan, or even Chung-king, in the province of Sz'chuan; then to march to its capital (Ching-tu), and obtain passports from the viceroy for Tibet; thence march west over the lofty mountains skirting the western border of China, and proceed to Lassa; then to continue our course west, along the northern slopes of the Himalaya range to the Lake Mansorawa, where we should strike the road across the Himalayas into the plains of North-Western India, a distance of about 4000 miles.

This river traverses the whole breadth of China from west to east. It rises by several sources in the centre of Asia, receives the waters of the lofty table-land of Tibet, as well as the snow waters of the ranges of mountains dividing that country from China.

On its course towards the sea, after leaving Tibet, it takes a southerly direction along the northern borders of the south-west province of Yu-nan, where several important tributaries from north and south swell its waters. It then runs north and east through the western province of Sz'chuan, and its importance is increased by the addition of several streams from the north, which, draining this mountainous territory, become themselves large rivers before their junction. The most important of these are the "Min," Fu-sung, and Ho-tow, from the north; while the rivers Chi-shui and Kuing-tan-ho rise in the province of Kwei-Chou, and discharge their waters from the south.

Leaving Sz'chuan, the Yang-tsze-Kiang traverses the whole length of the central province of Hoo-peh, and dipping down to the south-east receives the waters of the great Tung-ting lake, whose confluence, as large as the river, swells it into nearly double its size. This lake, the largest in the empire, is fed* by large rivers from the south, which drain the province of Hoo-nan, and separated from the sources of the Canton River by only a few miles of high land, and to the west anastomosing with the latter, form the road between Canton and the Upper Yang-tsze, by which the trade between Sz'chuan and the North-West Provinces is still carried on with Canton. Its course is then to the north-east, bounded by a range of hills to the south

as far as Han-kow, where the river Han falls into it from the north.

The next important tributary is that from the Poyang Lake, the river again dipping to the south-east to form a junction. This supplies a vast body of water, being formed by large rivers draining the great province of Kiang-si; and it is through this lake that the water-communication between Canton and Peking is carried. Thence the noble river winds its course north-east towards the sea, through the provinces of Anhwei and Kiang-su, the Great Imperial Canal crossing it at Ching-kiang-fu, 180 miles from its mouth; and from here to the salt water it gradually widens to 20 miles.

On the 11th February of last year our little party embarked on board H.M.'s steamer *Atalanta*, by the kind permission of Admiral Sir James Hope, who allowed us to accompany his naval expedition to Han-kow; and on the following morning the squadron left Woo-sung River and steamed slowly up the little-known waters of the Yang-tsze.

You will have heard the account of the Admiral's expedition to Han-kow, for the purpose of opening the river to trade, to place consuls at Ching-kiang-fu, Ken-kiang-hien, and Han-kow, the new ports, and to come to some amicable understanding with the rebels at Nankin. For a description of the river as far as Han-kow I must refer you to Oliphant's work,* written when accompanying Lord Elgin in 1858. I will only add that, from the several delays caused by the vessels grounding, we expended one month in getting to Han-kow. This gave us ample time to land and shoot, or visit the Tai-pings and the country in their hands.

At Ching-kiang-fu we were detained a week, and amused ourselves in wandering, with our guns, over the country, which abounded in game. This once beautiful city contained 600,000 inhabitants, and was the most flourishing on the river as a mercantile port, owing to the Grand Canal crossing the river at this part; but the rebels, when they evacuated it two years ago, left it a heap of ruins, and it now contains but 2000 persons, chiefly Imperial soldiers.

We mounted a lofty hill at the back, which overlooked the city and its extensive suburbs, and beheld a scene of desolation, a helpless wilderness of ruins; the numerous white walls and gable ends resembling one vast cemetery. A few wretched poor in rags were wandering about the rubbish in search of firewood. The country was cut up and lined with extensive earthworks and trenches, and dotted with numerous ruined villages and hamlets. We rambled for many miles over uncultivated farms, with the

* See Journal of the Royal Geographical Society, vol. xxx.—Ed.

deserted roofless buildings showing marks of fire and destruction. The little gardens in front were choked with weeds and brambles, the great dams for irrigation thrown down, and among the blackened walls of ruined villages and dismantled temples we often came upon the skeleton of a human being lying upon some rotting straw, the bleached bones issuing through many parts of its threadbare clothing.

At Nankin we spent a few days, and witnessed even greater distress and misery. We found a Celestial King, a miserable Canton coolie, dressed in silks and satins of many colours, his satellites and soldiers robed in ladies' dresses, the loot of prior victories.

In the habitable part of the city we met their captive women, and observed on the average five of them to one man. The whole population were in abject misery; badly clothed and half-starved. Their features wore a sad and careworn look, and their dwellings were hovels of revolting filthiness. Nine-tenths of this great city, surrounded by a noble wall 50 feet high and 20 miles in circumference, is a mass of jungle, interspersed with piles of ruins; not one building of importance is standing.

The surrounding country was totally deserted; orchards of peach-trees and dismantled cottages showed where once stood a happy, thriving village, encircled with terraced rice and wheat fields, and now all a desert as far as the eye can reach.

We visited the tombs of the Mings, monuments of the departed glory of the early Emperors, sacred to the memory of all Chinese, but these had not been spared. A heap of porcelain bricks marked where once stood the handsomest pagoda in the empire, the far-famed Porcelain Tower.

We visited "Woo-hoo," once a city of vast extent, but now almost destroyed. We walked through two miles of brick-bats several feet deep, the remains of a great suburb, and entered the city for the purpose of purchasing chow-chow. Here we witnessed scenes too horrible to describe. In the main street were heaps of reeking filth, on which were dying squalid children pining forth their expiring cry for food. In the roofless houses were crouched starving hundreds. In one I counted ten dying human creatures and three corpses; the former, lying in stinking straw, and exposed to the then drifting rain and snow, suffering from revolting diseases and starvation, were crying forth their unheeded supplications.

After passing "An-king," the highest point in possession of the rebels, how pleasant, how cheering was the contrast! Behind us we had left a desert, a howling wilderness; a once fertile land, now a barren waste; a people once thriving, industrious tillers of the soil, a happy, well-fed race; now an idle, vicious, starving mob,

grovelling in filthy crimes and revelling in hideous blasphemies, devastating the country with fire and sword for no other purpose than plunder: locusts in the human form, destroying both man and beast. Now that we had entered the land of the Imperialists, all around us teemed with life and industry. Trading-junks and fishing-boats speckled the surface of the waters; the country on both banks was green and fresh with young wheat; populous villages skirted the water's edge; the people well-fed, fat, and healthy, the old women working at the loom; buffaloes and oxen were at the plough, farms and hamlets dotted the undulating country, surrounded by stacks of corn; the labourer was everywhere seen in the fields, and all nature smiled in happy contentment.

On the 11th of March we arrived at Han-kow; and, after obtaining a proper junk and getting our passports sealed by the Viceroy of Wu-chang, the Admiral, leaving the rest of the squadron and taking us in tow, left on the 13th to explore the river as far as the Tung-ting Lake, distant 150 miles. This was accomplished in three days. The full account of this part of the river is given in his Report. The country between Han-kow and the lake is for the most part flat to the north; but ranges of hills skirt the southern bank, approaching the river and terminating in bluffs and again receding. The whole country was under rich cultivation, and the hills were terraced to their very summits.

The astonished natives, as we steamed slowly past the towns of King-kow and Sing-ti, lined the river-bank, peopled every junk and raft, and swarmed upon the house-tops to feast their eyes upon the fire-ships of the Red Devils.

We arrived at the picturesque city of Yo-chow on the 16th, situated at the mouth of the great Tung-ting Lake on a red-sand cliff, and occupying one of the most important positions for trade; all produce from Hoo-nan, as well as the greater part from Sz'chuan *via* the Tai-ping Canal, passing directly under its walls. Here the Admiral bade us good-bye, and, leaving us to our own resources, steamed back to Han-kow.

On the following morning we left the mouth of the lake and entered the Upper Yang-tsze, which is only half the width of the river below the lake. And now we began our slow and arduous journey of from 12 to 20 miles per day by means of sailing, tracking, poling from the bank and sculling, according to circumstances; making fast to the muddy walls of the shore at night.

Our course for some days was through a vast level country; the whole under rich cultivation, chiefly wheat, beans, and millet. The river is here most tortuous, and its banks are steep walls of alluvial deposit, 20 to 25 feet high. The country is thinly popu-

lated, and the villages are built of reeds, owing to the annual overflow of the river in June, but after the crops are harvested.

These inundations had left large swamps and lakes, which abounded in wild-fowl, affording us capital sport, as well as furnishing our table. The country was also well sprinkled with pheasants; and generally after breakfast we landed with our guns, following the course of the trackers in search of game. The river also afforded us the best of fish, from dace to sturgeon; while an occasional calf for 6s. added to the larder, and vegetables were to be had in abundance.

We found the natives here very civil, and ready to supply us with chickens and eggs, with rice and flour, at moderate prices; but as we got higher up the prices rose 1000 per cent. They always showed great timidity on our first appearance, and would often run away; but soon gained confidence, and pressed upon us in crowds, to examine our odd dresses and white skins, and wondered why our hands and faces should be darker than the covered portions of our person, and often the terms *Ho-Sun* (Monkeys) and *Fang-quatz* (Foreign Devils) escaped their lips. In passing through the villages or towns, the mob would become so unruly that the use of the stick was often necessary to keep them at a respectful distance. These crowds would be of the most motley kind. Old women would leave their spinning-wheels, children their toys, gentlemen and shopkeepers their houses; labourers, deserting their plough and oxen, would come running from all quarters to the focus of attraction, while vagrants and beggars mingled in the crowd, all squabbling, jostling, and fighting, to get sight of us; and it was impossible to land near or at large towns without undergoing this suffering. On visiting officials and entering cities, chairs were always sent for us with a guard.

The first high land we came to was on the right bank. Three distinct ranges of hills from 500 to 1000 feet high, from their peculiarities, we named the Camel-hump, Ass-ears, and Boulder Range. At some distance above the last are two smaller hills surmounted by temples, which we christened The Great and Little Temple Hills. At the foot of the latter stands the walled town of *Shi-show* (Stonehead), on the right bank of the river, where we arrived on the 23rd of March. We ascended the hill, which is composed chiefly of red granite, and found the temple in ruins, and containing heaps of earthen josses or gods, perched on platforms round the walls. The city we looked down on was also in ruins, and nearly the whole walls thrown down; three-fourths of the interior was occupied by kitchen-gardens. Along the foot of the hills the country was inundated, and the houses on mounds, dotting the expanse of water, formed numerous islands; the surrounding country was a vast level.

As we proceeded, we often came to the river-embankment, of great age and strength, which takes the general course of the river, but often diverges some miles inland where the river takes a sharp bend. This great work, which extends many hundreds of miles, is kept up by the Government to protect the valley of the Yang-tsze from inundation. Its general width at the base is 100 yards, and the summit about 30. We observed that the repeated deposits from the annual overflow had raised the intermediate land to within a few feet of its top, while the country which it protects, remaining at its original level, is some 40 feet from its summit.

At the town of Ho-hia the river had made great inroads into this work, which was undergoing extensive repairs; and we noticed that the surface of the river, in its then low state, was rather above the level of the country on the other side of the embankment, and in June would be 20 feet below it. On the embankment are well-built temples and villages of stone and brick, as well as on the country enclosed, while on the river-side they are generally of reeds and mud.

On the 28th we arrived at Sha-tsze, the port of Kin-chow-fu, a city one mile inland, situated on the left bank. We had now travelled by the river about 300 miles above Han-kow, while by land the distance is only 200 miles. Here we found the river, which since leaving the lake had been almost deserted, again crowded with junks; several hundred of these from Sz'chuan were moored along the banks for two miles. Five miles above is the mouth of the Tai-ping Canal, communicating with the lake through which most of the traffic is carried to Han-kow. We ascended the lofty pagoda to survey the country, and the view from its summit was enchanting. The country, the same extensive level, was dotted with white sails, the water being hidden from view, which seemed as if moving among the green fields. Numerous extensive lakes were everywhere to be seen, and canals and ditches divided the country as our hedges do in England.

The city of Kin-chow, which is surrounded by a strong wall, is said to contain 600,000 people. The country between it and the port is one vast cemetery of mounds, tumuli, and memorial arches: no coffins being exposed as at Shang-hai. Beneath us was a sea of heads, a dense, closely-packed mob, through which we had great difficulty in passing to get to our boat. We were visited by the officials of Kin-chow, who brought their families to see us: one—a military mandarin—brought his grandmother, mother, wife, and children; some of the ladies were pretty, and elegantly dressed. Presents of tea, sugar, and flour were brought us.

Soon after leaving and proceeding west, the country changes

and becomes undulating; the embankment was seen no more, and distant hills serrated the western horizon. As we neared I-chang, the dim blue outline of lofty ranges opened up in the north-west direction.

On the 30th of March we passed the city of I-tu, at the confluence of the Chin-kiang, on the right bank; and shortly after passing a narrow portion of the river, formed by converging conglomerate masses, where we observed the line of the river's rise to be 50 feet, we arrived at the Tien-chow Pagoda, two miles below I-chang, and the following day we moved up nearer the town. We reached I-chang on the 31st March, and had now ascended a distance of 1000 geographical miles from its mouth and 360 from Han-kow, and had found sufficient water for large steamers; being never less than $3\frac{1}{2}$ fathoms in mid-channel. We had also arrived at the termination of the low country, for to the west and north-west were ranges above ranges of lofty mountains. The city of I-chang, built on a slope on the left bank, from its position commands the high road from the Western Provinces; all produce having to pass the great gorge 3 miles above it. We found 20,000 braves or militia soldiers in transports, ready to proceed west to engage the Sz'chuan rebels.

During our two days here we were the wonder of the place. The bank was thronged with thousands of soldiers, while the water seemed alive with pleasure-boats, containing gentlemen and merchants with their wives and children, bringing with them their chow-chow and sweetmeats, to spend the day upon the water. The whole scene resembled a Thames regatta-day. With our guns, we landed on the right bank and entered one of the numerous gorges dividing the confused masses of conglomerate; and, after an hour's ramble without finding game, ascended one of the huge blocks 1000 feet high. Here a most extraordinary scene presented itself: around us were these huge masses in the utmost confusion, for the most part independent of each other, and five times as big as St. Paul's Cathedral. Some had assumed the forms of sugar-loaves, and others were flat-topped, with precipitous sides. At the base of many were caves inhabited by sickly poor, who cultivated small patches of rice and wheat; while on the summits of others, and on the brinks of giddy precipices, were Llama temples. To the west and north towered ranges of lofty mountains; and the river seemed to terminate a few miles above the city. To the east were small hills and undulating country to the plains beyond. We had here to change our boat for one more suited for the gorges and rapids, being made stronger and altogether different from the lighter craft used on the river below this port.

On the 5th of April we again started, and passed through the

labyrinth of large junks off the city, crammed with armed men: many of them were mere youths, while others, old rascals, showed scars about their faces, which added greater ugliness to their villanous features. The shouts and peals of laughter from these, with the cries from the swarms of small sampans like bees around us, capsizing each other, were deafening. After passing 3 miles above the city, we suddenly came to the Great I-chang Gorge; and our course, from north, suddenly became west, and from a noble expanse of water 1000 yards wide, the river became contracted to 250 yards.

As we entered slowly against a stream of 5 miles per hour, the contrast was strikingly grand: we had been two months in an open country, ascending a wide, quiet stream, and now had suddenly entered dark, narrow gorges, through lofty mountains, where the water rushes with impetuous speed over hidden rocks. The banks on each side towered above us 500 feet in sheer perpendicular walls, with huge masses of rock here and there seeming to overhang their tops. Deep gorges opened on each side with waterfalls taking leaps of 200 feet: some, jetting from the face of the cliffs midway down, dwindled into feathery cascades before reaching the bottom; others descended from the very summits of the walls, which, enveloped in mist, gave them the appearance of water-spouts issuing from the clouds; and others escaped from mouths of caves and tumbled over grassy slopes. As we ascended, after passing a custom-house station, the gorge became still narrower, the walls of 800 feet enveloped in mist, and in many parts the water resembled a boiling caldron. Large caverns pierced the rock in several parts, some on the water level, wherein were fishing-boats at anchor, while others were entering their dark regions. Some, 100 feet high, were inhabited by Llama hermits, the only access being a chain or rope from the water. We sometimes passed a little hamlet with terraces of cultivation, where the formation of the cliff would allow of it, and occasionally a Bhuddist temple perched on a beetling rock 500 feet above us. At every turn the scenery altered and varied: the rocks were thrown into and assumed all imaginable shapes; arches across gorges, dark and misty, and caverns admitting daylight from the top, from which escaped screaming birds of prey.

After emerging from the gorge, the country becomes more open; yet mountainous, and well wooded with oak, fir, and cedars. We passed well-built houses almost buried in cover: pretty granite bridges spanned the gullies in their gardens, and grottoes, tastily covered with creeping plants, occupied conspicuous positions. The stream here begins to be obstructed and divided by masses of granite, over and between which the water foamed and tumbled with a great noise. We had now arrived at the first of the rapids,

many of which we had to ascend during our upward course. These can exist only during a few months of the year, when the river is low, but disappear at its rise. On our return many no longer existed, the river having risen considerably. The ascent of these is often attended with danger; the towing-line sometimes dividing, and the boat driven back with great velocity against the rocks and dashed to pieces. We passed the wrecks of some of these unfortunates. At all these rapids a village is stationed, and the people gain a living by assisting the crews in dragging their boats up. This is performed with great caution: after a stronger line has been carried several hundred yards above the rapid, and the villagers, to the number of 100 or more, added to the crew, and several natives have been stationed on projecting rocks, to clear the line, the boat cautiously advances; having five men in command of an enormous sweep, which projects over the bow 30 feet. Others are armed with bamboos, to pole her off any dangerous rock. She approaches under the influence of an eddy, and suddenly dashes into the foaming torrent. The line, which is of the strongest and lightest description, being of bamboo, becomes as tight as a bow-string, for the junk is now in the strength of the rapid, and inch by inch is dragged into the quieter water above.

The boat often becomes very unsteady when the line catches any of the numerous rocks, and it is then that these savages dash into the torrent to release it; but often too late to prevent her coming into collision with a rock, the shock from which is prevented by a beam of very hard wood being projected to meet it, the end of which is made fast by a few turns of a rope to a cross-beam of the boat; at the same time the great sweep is continually dipped into the stream to steady her head. The labour the people undergo during the ascent of these rapids is excessive, and their shouts and drum-beating as signals, with the roar of the water, almost deprive one of hearing.

After the ascent of two rapids, viz. the Shan-tow Pien and Cormorant Rocks, we approached the great Lucan Gorge, and as we entered we seemed to leave daylight behind. This is a deep rent in the mountains, the strata corresponding on both sides, and appears to be of hard, grey limestone. It is far grander than the last, the passage being narrower, the walls more lofty, and the water deeper; close to the cliff, finding no bottom at 20 fathoms. A small interval only of a few miles of broken cliff and grassy slopes separates this from the Mi-tan Gorge, and here it seems as if the great walls had slipped, in one part causing the formidable rapid of Tsing-tan, where, at the village of this rapid, we observed *coal* for the first time since leaving Yo-chow. The grandeur of this gorge equals that of the Lucan. The passage through these is often very tedious, having no tracking-path in many parts, and

even where it exists it is so narrow and at so great a height that the danger is imminent. In many parts the path is cut out of the living rock, not wider than 12 inches, and 200 feet from the water, with nearly perpendicular walls above and below. It is sickening to watch some 30 or 40 men on these ledges, dragging at the line; sometimes they slip, and are precipitated and lost, but generally are saved by catching the line, which has the full weight of the rest, and supports them.

At all the breaks and intervals between the gorges, the country is thinly populated, and supported by the scanty cultivation wherever it can be produced.

On the 8th of April, after leaving the Mi-tan, the lofty hills formed slopes to the water's edge, well covered with oak, elm, fir, cedar, and chestnut. On the same day, at a sharp bend of the river, we arrived at Kwei, on the left bank, a walled town of little importance; two miles above which we came to *coal-mines* cropping out from the hill-side, near the rapid of Ye-tan, which had a fall of 4 feet in 30 yards, near the bank.

The next town passed was Pa-tung, and on the 10th we passed through the long gorge of Wu-shan, called after a town of that name, situated at its upper end on the left bank. In the middle of this are two minor gorges entering at right angles, which mark the boundary between the provinces of Hoo-peh and Sz'chuan. The upper portion of this gorge is also remarkable for the number of inhabited caves, some 200 feet from the water. We first observed the cultivation of the *poppy* near Wu-shan.

On the 12th we passed through the Wind-box Gorge, which is remarkable for a village built under the beetling cliff, some 100 feet above the water, where the genial rays of the sun can never reach it. Immediately after issuing from this, we opened the city of Kwei-chow, and anchored under the walls for the purpose of making inquiries regarding the road to the capital. This city, built on the left bank, stands on a slope 100 feet above the water, which has a small tributary immediately below it. Like other cities of China, it looks pretty from the water, with its many-coloured temples and pagodas; but within are narrow streets, reeking with filth and everything disagreeable. The officials were very civil, but had heard nothing of the Tien-Sien Treaty.

On the following day, 13th April, we left for the town of Wan, 40 miles higher up. The surrounding country is more open, the hills not so lofty, and receding from the river, beautifully cultivated from the banks to the very tops, looking green and refreshing, and forming a great contrast to the rugged and dark gorges through which we had just passed. The valleys were well wooded with oak, chestnut, and a tree producing a nut called the Tungtz, very poisonous, from which the natives extract an oil. Amid these

shady retreats are hamlets and villages totally different from those seen in Hoo-peh and other eastern provinces, and resembling somewhat Swiss architecture.

Besides wheat and beans we found the poppy and tobacco extensively cultivated. It was then the opium-harvest, and women and children were employed in lancing the pods, and collecting the tears of the previous night's incisions into earthen pots. The poppy is very largely cultivated in this province, and we were told that they hoped shortly to produce sufficient to supply the country. For more than 200 miles in succession, the river-banks and terraced hills produced little else but this drug and tobacco; but as we proceeded farther the crops were gathered, and we were not able to judge of its growth beyond, as the harvest is over in the beginning of May. It is extensively smoked by men, women, and even children. Our boatmen, whose pay per diem was but 100 cash, or five pence, could afford to indulge in this luxury after the day's toil; and they would rise in the morning hale and hearty, and ready for the fatigues of tracking under a broiling sun for 15 hours. I never witnessed any pernicious effects from its moderate use; and although when used to excess it has the same injurious effects on the brain as ardent spirits, yet it has the advantage over the latter, that it soothes rather than excites the exhausted powers, both mental and physical; and no disgusting exhibitions—so common in this country—are seen among the people of the interior. The native tobacco is much used by all classes, but it is of an inferior quality to that in Manilla and Cuba.

The river becomes wider above Kwei-chow, averaging 200 yards, and although obstructed by rapids, only one, the Low-ma (Old Horse), was found equal to those among the gorges. Along the shingly flats and islands which we often passed, the natives were washing for gold, and at one part the river is called the Golden Reach. Two miles below Wan is one of these extensive flats, which was marked out by Government into lots, and let out to the washers, who were in great numbers.

We arrived at Wan on the evening of the 16th of April, and had attained a distance of 1250 miles from Woo-sung or Shang-hai. The following morning we received visits from the officials, who informed us that it was impossible to proceed by land to Ching-tu, as the whole country was in the possession of rebels and robbers. We proposed to the General that we should lead his army on to battle, and cut our way through; but he would not listen to it, and recommended our following the river to the city of Chung-king, 200 miles farther west.

We left Wan on the 18th, and the following day came to the large village of Hu-lin. Two miles below this, three gentlemen boarded us, and entering the cabin immediately prostrated them-

selves before us, bumping their foreheads three times on the deck. They then informed us that they were Christians from the village above, where some thousands of the same persuasion were living; that they had heard of our approach from boats preceding us, and had been sent by the head men to meet us, and to invite us to stay a day with them and rejoice with them in the happy prospects that the Church would now no longer be persecuted, since the true Christians from the West were travelling the length of their land, in their native costume, without disguise and without fear. As we neared the village, the banks became lined with the people dressed in all their best; while others, more eager to welcome us, came off in small boats, and crowded on board to bow before us. It was in vain that the Rev. Mr. Schereschewsky told them that we were but men like unto themselves, and that it was very wrong to do so: their reply was always that we were the Holy Men from the Western Ocean, who had first brought the glad tidings, and respect and reverence were due to us. He then tried to explain to them the difference between the Roman Catholics and Protestants, which they could not understand, saying we all worshipped the same Jesus Christ and his Mother. The larger junk, containing the rest of the party, being far behind, we gratified them by visiting their chapel. Sedan-chairs were in waiting, and we landed under an Imperial salute of three guns, while crackers and fireworks were let off without number. No common coolies carried our chairs, but the gentlemen of the place, who squabbled among themselves for this honour. As we passed through their narrow, crowded streets, fireworks and bombs were exploded by a procession in front, almost suffocating us with the smoke. We found their chapel to be a miserable building, containing the usual Romish decorations; but they told us that the mandarins had recently destroyed their little church, and they had not yet the heart to rebuild it. In spite of our remonstrances, the same prostrations were performed by these proselytes of the Romish faith; who considered it a great privilege, and repeatedly asked our blessing. It was sad to see the great disappointment depicted in their faces when we told them time would not permit us to partake of the banquet they had provided for us. On returning to our boat they heaped presents of all kinds of chow-chow upon us, and begged us to report to the Bishop of Chung-king the shameful treatment they had received from the mandarins. This is only one of the many instances which we witnessed of the good these Catholic priests have done in China.

On the same day we passed the great rock temple and village of "Shi-pow-chai," or House of the Precious Stone. This rock stands solitary and alone, and is 250 feet high, with a sheer perpen-

dicular face. A Llama village stands on its summit, and the only access to it is by a handsome nine-storied pagoda, built into the rock and reported to be 1500 years old.

The country between Wan and Chung-king is beautifully varied. In some parts the mountains slope easily to the water, well wooded with plantations of orange, and tropical vegetation mingled with that of a colder climate. The poppy was everywhere to be seen, and we passed several *iron* and *coal* mines.

On Sunday the 28th of April, at 3 P.M., we arrived at Chung-king. This city is of vast extent, and divided by the clear waters of the Ho-tow, each portion being built on beetling sand-cliffs, surrounded by a wall of 50 feet. This double city is the most important in Sz'chuan for commerce as well as a military station, and it was here our little party was only saved from total destruction through the vigilance of the bishop.

On the morning after our arrival, as we were about to enter the city to visit the Tau-tai, a heated and excited messenger delivered to us a letter from the bishop, begging us not to leave our boats, and to arm ourselves at once, as he had discovered a plot that the soldiers were ready to assassinate us on our entering the city, and then plunder our boats.

We were not long in preparing for the worst. Our four Sikhs were armed with our double guns, while we had our rifles and revolvers, making in all 32 barrels. During this time the soldiers were collecting in masses along the shore, and our landing-plank was drawn on board.

Another letter soon followed the first, saying that 12 A.M. was the hour they intended attacking; and we made ready to slip from the shore as soon as the fight began, and the leaders were picked out as the first to bite the dust.

The hour came, but no attack; and we supposed that our war-like appearance cowed them, for Colonel Sarel had put on his uniform. Had they fought, we might have been overcome by numbers, but the Whitworth ball would have told fearfully among such a mass. The following day the authorities had quieted the people, and Sarel and Blakiston visited the prefect, leaving the boats in charge of myself and the Sikhs.

Finding here, as at Wan, that the land-route was held by the rebels, we continued our ascent of the river as far as Su-chow, thence hoping to reach the capital by ascending the river Min.

On the 4th of May we left the inhospitable people of Chung-king, and arrived at Su-chow on the 18th, distant 1750 miles from Woo-sung.

We passed many walled cities, the most important being Ho-kiang, Lu-chow, and Kiang-an. Twenty miles above Chung-king

we passed the picturesque rocky island of Kin-tin-tsze, rising from the bed of the river in the form of a sugarloaf, and capped with a handsome temple and a two-storied pagoda.

The scenery of this portion of the river surpassed in beauty any yet seen. The people are a stronger and finer race, and depend on themselves for safety, having strong redoubts near their villages to flee to in case of necessity. The opium had been harvested, and the terraced hills were green with young rice and Indian corn.

At Su-chow we witnessed another instance of the rotten state of the Government. The city gates were closed against their own militia, who had arrived to protect the place against the rebels, and a letter from the prefect informed us that, if these entered, they would doubtless overcome the Imperial soldiers and sack the city. A great fight took place between the braves of Yu-nan and those of Sz'chuan, which lasted eight hours, and their officers came to us for protection. When the battle was over, the slain were dragged to the bank, robbed of their clothes, and pitched into the water.

These braves were always a great annoyance to us, and we were often in danger of being robbed and murdered by them. Among their own people they can do as they like, entering their houses or boats, examining every article, and taking away what they please. This they tried with us, but were always so roughly handled that they saw plainly we were not afraid of them. One of our party, while out walking and far away from the boat, happened to be surrounded by them, and one, more bold than the others, tried to trip him up, but was immediately felled in the usual English manner, though in the best of good-humour, the Englishman laughing heartily at his prostrate foe. The crowd responded with roars of laughter, leaving their companion to slink away as best he could. On another occasion, one of our party, while shooting quail in the ripe cornfields, found himself surrounded by several hundreds of these ruffians, who were much surprised when they saw him making double shots; but when he took a 50-cash piece, which is twice the size of a penny, and, pitching it into the air, blew it completely away, they looked upon him as a being with miraculous powers, and probably fancied the same might be performed on themselves if they misbehaved. It was by these means, and showing no fear, that they left us alone; and I believe that ten judicious Englishmen might travel the length and breadth of the empire without very great danger.

All classes believed that with our binocular glasses we could see through city-walls and several feet beneath the surface of the earth, and had the power of discovering any mineral wealth. This was given as one reason why they objected to our travelling by land.

The accounts which we had heard regarding the rebels proved here to be too true, numbers of headless bodies continually floating past us from the river Min. Our boatmen positively refused to proceed up this river, and there was no help for it but to track the boat ourselves, which some of our party did not agree to; so it was decided we should ascend the Gold Sand River—which the Yang-tze is called above Su-chow—with a forlorn hope of getting into some quieter district. The river above Su-chow becomes very narrow, and passes through a mountainous country, but we always found deep water. After ascending 25 miles, we came to a remarkable gorge, 14 miles in length, where coal crops out from its precipitous walls. At every turn and in every direction were galleries worked by the natives; some of them were 800 feet from the water, and the coal descends in baskets sliding on stout ropes to the junks below.

On the 25th of May we arrived at Ping-shan, the farthest point reached by the expedition; and here, after repeated ineffectual attempts to obtain land-transport—for our crews refused to proceed farther—we made up our minds to take possession of a temple well positioned for protecting ourselves against an attack, and spend a few months in the hope that the country might then become quieter.

All preparations having been made for leaving our boats the following morning, we sat down to our dinner, when suddenly a noise like the shouts of a legion of maniacs rent the air, and we instantly armed ourselves, thinking the people were making a rush at the boats; but we found the rebels were pouring down the hill at the back of the city and attacking it. The whole hill side was lighted up with hundreds of lanterns, and the city walls also suddenly became illuminated with torches at each of the embrasures. The yells and cries from the combatants, and the explosion of gingalls and cannon, were so great that we could scarcely hear each other speak. I had only just time to jump into my boat when our crews cut us adrift: from the darkness of the night and the din of the battle we could neither see nor hear each other, and consequently our boats became separated, myself and one Sikh only occupying the smaller.

It was an anxious night for all; for wherever we attempted to make fast to either bank, an explosion of gingalls drove us away. During the night, however, we effected a mooring on the Yu-nan side, and I and my Sikh were standing on the house watching the battle, when several men rushed at our boat, and, after firing three heavy gingalls within 15 yards, obtained a footing on our junk; but we soon cleared the deck and got away with the loss only of one of our crew. The next morning we picked him up on the opposite bank, he having taken to the water for safety. At day-

break, seeing no trace of the other boat, I slowly dropped down the stream to search for it; when a few miles below the town, to my great joy, I discovered it safely at anchor under a beetling cliff.

Thus, after ascending 1800 miles of this river, exploring and surveying 900 miles beyond any other European save the Jesuits in the Chinese costume, and penetrating to the western borders of the empire—for we were only a few miles from the country of the independent tribes the Maoutse—we had now to abandon all hope of carrying out our original plan of reaching India *via* Tibet, and returned to Shanghai after an absence of five months.

But, although failing in accomplishing our grand object, our labours had thus far been successful; for we had discovered that the mines of the great coal-gorge, if properly worked, would supply sufficient fuel for the consumption of all the steamers in China; that the valleys of the mountains produce abundance of corn, tea, silk, and opium, and in quieter times the amount would be quadrupled, and Shanghai must become the emporium of this great artery; also that at certain seasons the river is navigable for light-draught steamers 1800 miles.

In a geographical point, we had discovered that the north boundary of the south-west province of Yu-nan forms the right bank of the river at Ping-shan, which the present maps represent as 100 miles to the southward. We had also come to the conclusion that there was no Imperial rule in China; that bands of rebels and robbers were devastating the country in all directions. In the eastern provinces were the Tai-pings; in the south-west the formidable band of Mussulmans; and in Sz'chuan the Tu-feh: how many others we could not tell, but many, no doubt; and these have no connection with each other. We also found that the followers of the Prophet were very numerous, and Roman Catholics were everywhere to be met, ready, at all times and at their own risk, to assist Europeans.

At Ping-shan we were visited by a chief of the independent tribes and a few of his followers. We found them a taller, stronger, and much darker race than the Chinese: their heads were completely shaven, and they wore a turban peaked in the front. They were without the prominent cheekbone and almond-shaped eye of the Chinese, their features resembling more the natives of India. From them we received marked kindness, and they told us that if we could get into their country there would be no difficulty in passing through to India. The Chinese thought we were in some way connected with them, and called us the *White Maoutse*.

III.—*The Fiji Islands.* By M. BENSUSAN.*Read, April 14, 1862.*

THIS group of islands is the finest in the South Seas. Distant about 1800 miles from Sydney and 2200 from Melbourne, they extend from $15^{\circ} 30'$ to $20^{\circ} 30'$ south latitude, and from 177° east to 178° west longitude. The group contains 180 reef-bound islands, 80 only of which are inhabited. Together they cover an area of about 40,000 square miles.

They were discovered by the Dutch navigator Abel Jansen Tasman in 1643, and were subsequently visited by Captain Cook and by Captain Bligh in 1792; they were surveyed by Commodore Wilkes, of the United States Exploring Expedition, in the years 1839-40-41-42-43. Commodore Wilkes published a most interesting narrative of the expedition, and likewise a large and minute chart of the group, which I believe to be the best of the day.* Captain Denham since then examined the group in H.M.S. *Herald*, and published a chart of the Archipelago.

The population has been estimated by some at 300,000; by Commodore Wilkes at 133,000; and by others at 200,000; which last estimate I believe to be most correct.

It is certainly a difficult matter to arrive at even an approximate census in such a country: firstly, because very few Europeans penetrate into the mountains to form their own idea of the population; and secondly, because the natives' ideas of calculation are very limited, for if you inquire of a native how many people live on such a mountain, he will be sure to say an immense number; but it is impossible to learn from his description whether he means one hundred or two thousand.

In 1804 a number of convicts having escaped from New South Wales, twenty-seven of them settled here. Engaging in warfare for and against certain native chiefs, these men, through strife and excesses, soon decreased in numbers. In 1806 the group was visited by trading-vessels, for the purpose of procuring *bêche-de-mer* and sandal-wood for the China markets; and in 1809 the brig *Eliza* was wrecked on the Nairi reef, and a Swede of the name of Savage, passenger in her, saved a portion of her cargo, consisting of muskets and gunpowder, and taught the natives the use of fire-arms. This made him very popular, universally feared, and respected. Prior to this event the only Fijian weapons were clubs and spears, and these they were in the habit of using both cowardly and cruelly. Even to this day every man carries a club, stuck in

* Admiral J. Erskine visited these islands in the years 1849-50, and published his *Journal* in 1853.—ED.

his scanty apparel, in the daytime; and when he abandons himself to repose, his first care is safely to deposit his weapon so that it is ready to his hand.

"So beautiful," says Commodore Wilkes, "was the appearance of the islands, that I could scarcely bring my mind to the realizing sense of the well-known fact that they were the abode of a savage, ferocious, and treacherous race of cannibals."

At the east end of the group the Asiatic peculiarities prevail, dying away as we go westward, and giving place to an African, though not negro type.

Until lately a strict observance of their brutal custom to slaughter all shipwrecked or distressed foreigners who may have been cast on their inhospitable shores, has tended to maintain intact the aboriginal race.

The people at the east end of the group are much finer built than those to the westward; the former possessing a mixture of Tongese blood in their veins, and being in some cases really handsome, somewhat resembling the natives of New Zealand.

In the year 1840 only one of the escaped convicts who had settled there, an Irishman of the name of Paddy Connor, survived. He was fighting-man for the King of Rewa; and his influence among the natives was so great, that all his desires, some of which were of the most inhuman kind, were gratified: the King of Rewa always avenging, and often in the most cruel way, any real or fancied wrongs done to this man.

Viti Levu is the largest and most populous island in the group: it is 87 miles long by 57 miles broad, possesses a copper-mine, noticed and placed in Capt. Denham's chart, plenty of marshy land suitable for growing rice, and very fine timber. The British Government forwarded instructions to Consul Pritchard, about the middle of the year 1860, to explore the interior of this island.

Vanna Levu is the name of the other large island, which is 100 miles long by 25 miles broad, and supposed to contain about 20,000 heathens. There are in it mountains rising 4000 to 5000 feet above the level of the sea.

The island of Ovalau measures 8 miles from north to south, and 7 miles broad: it possesses a fine harbour on the eastern side, called Levuka, which is quite equal to an artificial dock. Vessels can always procure wood and water there, and the highest part of the island is about 2000 feet above the level of the sea. It has always been the favourite residence of the whites, and must continue to be so from its peculiarly central position with regard to the remainder of the group. Though it is not a productive island, the east side being all barren rock and the natives being more indolent than they are in other parts of the Archipelago, nevertheless there is a resident missionary and schoolmaster, an English, American,

and Hawaiian Consul, and a number of good mechanics. To illustrate the partiality that white men have for residing in Levuka, I can only say that the whole town has been destroyed by fire on various occasions, and has always been rebuilt on the same spot. There are two never-failing streams, having their source in the mountains, and nothing can exceed the calm beauty of many of the spots irrigated by these rivulets: magnificent drooping willows overhang the water, and convert the meandering stream into a luxurious bathing-place, sheltered, cool, and most conducive to health. H.B.M. Consul, William Thomas Pritchard, endeavoured to form a township at the south-east end of the island of Ovalau, and styled it Port Kinnaird, in compliment to the Hon. Arthur Kinnaird, who is reported to take great interest in the development of the resources of the Fijian Archipelago; but the access to and egress from this port and settlement are so difficult for ships, whether large or small, that no captain will ever take a vessel there unless compelled. Bureta, which is the native name of the land adjoining Port Kinnaird, must necessarily be disagreeable and very unhealthy, being entirely deprived of the trade-wind by its geographical position, and infested with mosquitoes. Port Kinnaird was formerly the residence of some white men, but was abandoned on account of its unfavourable position.

Moturiki is a very fine though small island: it is partly joined by a reef to Ovalau.

Wakaia, the island so favourably noticed by Commodore Wilkes, is owned by an American gentleman of the medical profession, now acting as United States Consul. This island is the residence of many of the half-castes, and is well stocked with pigs, cattle, poultry, rabbits, and various descriptions of game.

The valleys of Somu-Somu are well adapted to agricultural purposes, and the island of Kantavu abounds in very beautiful furniture timber. The remainder of the islands, except Bau, the capital, are unimportant. Bau is the residence of King Thakambau, his wives, children, and other members of the royal family. Thakambau, or, as he is often called, the Vanivalo, meaning the General, is a man about the middle height, copper-coloured, and about fifty years of age. He is highly intelligent, and fond of the society of white men: he has a large and handsome family, the younger branches of which he is desirous of having educated in Europe.

Lakemba is the largest island in the eastern part of the group, and is the headquarters of the Wesleyan missionaries. This mission was established about the year 1835, and the progress it has made is almost incredible.

Considering the proximity of the islands to the equator, they are neither hot nor sickly—the fierceness of the sun's heat being tempered by the cool breezes from the wide surface of the ocean. The

mean temperature of the group is about 80° , and 87° in the summer months; the extremes are 60° and 120° . One of the principal diseases is called dthoke: it has somewhat the appearance of small-pox, though far more disfiguring and formidable; it causes the body to break out in large ulcers, and is accompanied with rheumatic pains in the bones. It usually attacks children, and lasts from nine months to three years, frequently proving fatal. My slight pathological knowledge and my close study of the subject lead me to think that it arises from poor living, too much vegetable diet, and exposure to damp. Rheumatism is prevalent, and a species of elephantiasis, which, however, invariably leaves the patient with a change of air and climate. Cases of dysentery, pulmonary complaints, fevers, and ophthalmia, are very rare; and such Europeans as live temperately usually enjoy very good health.

I will now proceed to examine the character of the people, together with their barbarous habits and customs; and I fear that the result must leave with you, as it has with me, a most unfavourable opinion of the Fijians. In the first place, they are addicted to thieving, and, with all their ferocity, are very great cowards. They tell falsehoods, even when the truth would better answer their purpose: a man that is expert at mendacity is looked upon as a very accomplished individual. Covetousness, which is a great incentive to vice, is a strong feature in the Fijian character: the more one gives them, the more they want. In the year 1849 the former king of Somu-Somu wished to collect the people into the town in which he was residing, for the purpose of having them all under his eye; and the person ordered to communicate his desire was instructed to bake everybody who refused to obey the royal commands.

Thakambau, who has been formerly a most desperate cannibal, is the sovereign chief of Bau, and the most powerful chief in the group at the present day. He is not acknowledged at the east end of the group, and his authority is not so great as it formerly was. A few years since he would go to an island with ten or twenty tuns of empty casks, call the inhabitants together, and desire them to make sufficient cocoanut-oil to fill those casks within a stipulated time, intimating that if disobeyed the casks should be filled with the heads of all those who had failed to execute his commands; but, thanks to missionary labours, such tyranny no longer exists.

These people possess a root, highly prized all over the South Seas, called kava (*Piper methisticum*), of which they make a narcotic drink, called yangona. The process of manufacture of this is curious and original: it is masticated by young girls, spit out into a large bowl, and then mixed with water. After being squeezed and strained it is ready for use, and tastes very much like a mixture of Turkey rhubarb and soapsuds. They are in the habit of drinking

toasts and sentiments, as we do with wine, and one of their favourite ones is a *long pig*; by which they mean, may they soon have a cooked human being to eat. They likewise have innumerable brutal practices. Women are strangled with their own consent when their husbands die, thereby desiring to demonstrate to their late husbands' friends and relations their sincere affection for the departed; in short, they live and die like martyrs. Old men and women are often buried alive by their own children, from the idea they entertain that they are perfectly useless when old, and that their spirits are dead if their bodies be alive. Mr. Williams, one of the missionaries, relates a curious illustration of this practice. Mr. Hunt was called upon one day by a young man, requesting he would pray for the spirit of his mother, who was dead. On inquiry, the young man told him that his brothers and himself were going to bury her. Mr. Hunt accompanied the young man, telling him he would follow in the funeral procession and do as he desired him, supposing, of course, that the corpse would be brought along; but on meeting the procession, the young man said to him that this was the funeral, and pointed to his mother, who was walking along with them. Mr. Hunt naturally expressed his surprise to the young man, and inquired how he could deceive him by saying that his mother was dead: in reply to which he said he had made her death-feast and was now going to bury her, as she was very old; that his brothers and himself considered she had lived long enough, and that it was time to bury her; that she had given her consent to the proceeding. He added that it was from pure love for his mother that he had acted thus. Mr. Hunt did all in his power to prevent such a horrible crime; but the only reply he could obtain to his entreaties was, that she was his mother and he her child, and that they had a right to do what mutually pleased them. On reaching the grave, when all, including children, grandchildren, relations, and friends, took an affectionate leave of her, a rope was put round her neck by her own sons, who strangled her, after which she was put into the grave with the usual ceremonies. When a man, woman, or child is ill with a lingering disease, the unfortunate victim is strangled by his or her relatives. I heard of a man who ran a spear through his leg on the death of his child, I presume to make him feel the loss. It is a common practice to lop off one of their fingers on the death of a relative; and on the death of the former king of Somu-Somu, 100 little fingers were amputated, fastened to reeds and stuck in the thatch of the king's house, as a mark of respect. Self-immolation is by no means rare, they believing that as they leave this world so they remain ever after; that is to say, that by terminating their lives in youth, they will remain young in the land of spirits.

Cannibalism is one of their institutions; it still forms one of their

pursuits (out of sight of white men), and is regarded by the mass as a refinement. This is a subject of such a revolting nature and such painful interest, that, until recently, there were many who refused to believe in its existence in modern times; but such incredulity has been forced to yield to indisputable and repeated evidence. Late in the year 1851, fifty bodies were cooked and eaten at one time at Namena. The various ways in which these atrocities have been committed are really too disgusting to be related. Whatever may have been the original cause of that abominable practice in Fiji, whether famine or superstition, there is not the slightest excuse for its continuance at the present time. Food of every kind abounds (with the exception of butchers' meat), and the spontaneous supply of it is undoubtedly sufficient to feed ten times the number of inhabitants. The relation of their cannibal atrocities would be sufficient to make one's hair stand on end. They, however, have been daily diminishing since the settlement of the Wesleyan missionaries, and we may hope that they will be totally discontinued in the course of a short time. Thus far we find that the Fijians are notorious for lying, thieving, murder, and cannibalism. I shall add one more crime to the list which I do not find mentioned by any author—that of incendiarism. When a native owes a grudge to a white man, that is his system of revenge.

An examination of their religious system is attended with considerable difficulty: their traditional mythology is dark, vague, and perplexing. Nevertheless an idea of the Deity is familiar to the Fijian, and the existence of an invisible, superhuman power, controlling all earthly things, is fully recognized by him. Idolatry, in the strict sense of the term, seems never to have been known, for they make no attempt to furnish material representations of their gods, as is done in the Solomon group, to worship the heavenly bodies, the elements, or any natural objects: nevertheless they reverence certain stones as shrines of their gods, and regard certain clubs with superstitious respect. Nearly every town or village has one or more Bures or Temples; no pains being spared for their erection and finish. The Bure is a very useful place; it is the council-chamber, and small parties of strangers are often entertained in it. Though built expressly for the purposes of religion, it is less devoted to them than to any others. It is generally in these temples that their priests pretend to become inspired, though occasionally they do the same in private houses, and even in the open air. These priests are mere fortune-tellers, invariably pretending to be inspired by their mythological gods to enable them to foretell the result of a war, or the accomplishment of a marriage. When anybody consults them, he places a whale's

tooth (an article highly prized in Fiji, and formerly a sort of currency) and a dish of scented oil before the priest: the latter then anoints himself with the same, and on receiving the tooth, regards it with deep and serious attention; he then becomes absorbed in thought, and all eyes watch him with unblinking steadiness. In a few minutes he trembles; slight distortions are seen on his face, and twitching movements in his limbs: these increase to a violent muscular action, until his whole frame is convulsed, and the man shivers as if he were in a fit of ague. In some instances this is accompanied with murmurs and sobs. The priest is then thought to be possessed by his god, and all his words and actions are considered as no longer his own, but those of the deity who has entered into him. While giving the answer to any question put to him, his eyes stand out and roll as if he were in a frenzy; his voice is unnatural, his face pale, his lips livid, his breathing depressed, and his entire appearance like that of a furious madman. Perspiration runs from every pore, tears start from his eyes, and it really needs a person of very strong nerve to be an eye-witness to such a perfect piece of acting without feeling some emotion.

The Fijian language belongs to the Malay or Polynesian type, and, according to Mr. Williams, there are fifteen different dialects; though some bear resemblance to each other, there are many of them very different. I believe most of the missionaries are acquainted with a great many of them, as they have already translated the Scriptures into four different ones:—Bau, Rewa, Somu-Somu, and Lakemba.

The Fijian language is admitted to be the richest of any in the South Seas. A Fijian Dictionary and Grammar have been published by the Wesleyan Missionary Press, by the late much lamented Dr. David Hazlewood:—Good morning, *si yandra*; good night, *sa mothe*; one, *ndua*; two, *erua*; three, *dolu*; four, *vaa*; five, *lima*; six, *onu*; seven, *vitu*; eight, *valu*; nine, *eva*; ten, *teene*; one hundred, *ndua ndrau*; one thousand, *ndua undolu*.

Most of the words in Polynesian languages are in one or two syllables.

As the wealth of countries depends on the amount of value of what they export, it will be essentially necessary to commence by referring to what they do export, and then point out *how* those exports could be increased. By my calculation 150 to 200 tons per annum of cocoanut-oil is exported from Fiji; and before proceeding any further I will explain the different processes of manufacture. They take about fifty nuts in Fiji to make a gallon of oil, as the substance is scraped out of the shell and then boiled, by which process all the liquid evaporates except the oil. In the islands more to the eastward the substance

scraped out of the shell is put into a canoe moored close to the beach, and left to rot in the sun, which takes about ten days. In some places they make a gallon of oil from fifteen nuts, and in others they require more than fifty; partly owing to the quality of the nut, and partly from the ingenuity of the natives in the process of manufacture. With hydraulic presses of course much more oil is obtained, though a great deal depends on the soil and position of the trees, which should be grown on a sandy soil, as close to the sea as possible, and exposed to the sun and sea air. The nuts that grow inland are very small and poor, the trees bearing only half the quantity of those on the coast. The prime of life of a cocoa-nut tree is from ten to forty years. About 50 tons of *bêche-de-mer*, which is a smoke-dried sea-slug taken off the reefs, has of late been annually exported, though 600 tons have frequently been shipped direct to Manilla in twelve months. It is highly prized in China for making soup, and is considered by the Chinese a great delicacy. The consumption of this *bêche-de-mer* has considerably fallen off of late years in China, in consequence of a substitute called the mutton-fish having been shipped in large quantities from California to China at a much lower cost.

About 2000 lbs. weight of tortoise-shell is annually obtained in the group. About 100 tons of pearl-shell could be annually obtained if natives of neighbouring islands were introduced to dive for the purpose. Some very valuable pearls have likewise been found. Spars have lately been shipped, and the wood is valuable and very beautiful for furniture-making. With regard to the growth of cotton—that being the all-absorbing topic of the day—I find in Baines's '*History of Cotton Manufacture*' the following observations, which appear to me remarkably applicable to the Fijis:—"The plant flourishes most, and produces cotton of the very finest quality, on the sea-coast. The most valuable cotton known is the Sea Island, and is so valuable only because it is grown in close proximity to the sea." I take for granted that everybody is aware of the fact that cotton has been successfully sown, grown, and gathered, in this archipelago. Indigo, tobacco, tea, coffee, sugar, and rice, could all be cultivated with facility, so far as the climate and soil go; but the real stop to all such enterprise is the actual want of native labour—the natives will positively not work. People inquire why they will not work. My answer is, because they have no wants. The spontaneous supply of food far exceeds their wants. They make their own scanty dresses, build their own houses, their own canoes; make their own mats to lie upon, their own cooking-utensils of pottery; and they are independent of the white man, though they fear him, and respect his ingenuity.

Printed cottons, hardware, groceries, spirits of the lowest quality,
VOL. XXXII.

and many other articles, which are unsaleable elsewhere, are shipped thence for barter. A good many people are engaged in trade there, but there is plenty of room for more. Of late, people have purchased land for sheep-farming. For agriculture the Fijians surpass all the natives of Western Polynesia: they grow varieties of yams, and occasionally two crops a year. Their ordinary yams weigh from 6 to 12 lbs., and extraordinary ones from 30 to 100 lbs. Sugar-cane grows well, and ripens in about fourteen months: the canes girt from 3 to 7 inches, and the leaves are used for thatching. There are some fine orange-groves in the vicinity of Rewa, and some small cargoes have been shipped thence to New Zealand. They build fine large double-canoes, some 100 feet long by 25 feet beam, and 60 feet mast. These are singularly different from every other description of naval-architecture, as the sails are made the shape of a kite—that is to say, large at the top and narrow at the bottom. These sails are made of matting, and are sewn together with large sail-needles made of the shin-bones of men. Their mats, fans, baskets, and pottery are worth noticing. The arts of wig-making and hair-dressing are most ingenious; and when a chief's hair is dressed for an occasion, almost every hair of his head is separately curled, the operation usually occupying many hours. The women generally wear their hair cut close. About five pounds' worth of merchandise will pay for building a good native house, water-tight, cool in summer, and warm in winter. The cost of living is very trifling. The duties of the Fijian chiefs allow them much leisure time, as their only occupations are feasting and fighting. They have generally two or three attendants about their persons, who feed them, make and light their cigars, made out of native-grown tobacco, which is very good, and rolled in dried banana-leaves. An attendant priest and a number of wives complete the retinue of Fijian royalty. The dignity of a Fijian chief used to be estimated by the number of his wives, varying from ten to a hundred. Most of them are now Christianized, and live ostensibly with only one. Rank is hereditary, descending through the female: an arrangement customary nearly all over the South Seas.

It is by foreign commerce and capital that the resources of these islands must be developed, and a sufficient degree of material prosperity attained.

IV.—*Remarks on a Government Mission to the Fiji Islands.*

By BERTHOLD SEEMANN, PH.D., F.L.S., F.R.G.S.

Read, April 14, 1862.

IN 1859 Mr. W. T. Pritchard, H.M. Consul in Fiji and a Fellow of this Society, came to England in order to communicate to Her Majesty's Government that Cakobau (Thakombau), king of Viti or Fiji, had ceded the whole group over which his sway extended—a country about as large as Wales, or eight times that of the Ionian Islands—to the Queen of Great Britain. For various outrages asserted to have been committed against the life and property of citizens of the United States, the American Government had imposed upon Fiji a fine of 45,000 dollars, and the corvette *Vandalia*, Capt. Sinclair, had been sent to enforce the claim. In a country absolutely destitute of money—all exchange being carried on by barter—and having no regulated system of taxation, this sum was quite beyond the means of the Fijian king to pay; and one of the stipulations of the cession was that this debt, which the natives were ready to make good by assigning the proprietorship of 200,000 acres of good land, was liquidated. Capt. Towns, a patriotic citizen of Sydney, fully persuaded, like many other Australian colonists, that it would be highly desirable for England to possess the Fijis, actually offered to give a cheque for the whole amount, in order to remove, at least, one of the objections that might possibly be urged against the acceptance of the Fijian offer. One of the other stipulations of the cession was, that Cakobau should retain his rank and title as “king” in so far as the aboriginal population was concerned; while he made over to the Queen not simply a Protectorate, as the French have obtained at Tahiti, but the actual Sovereignty of the whole group, which, in order to give his cession full force, was ratified by *all* the chiefs in council assembled.

Her Majesty's Government deeming it necessary to obtain fuller information before any definite decision could be arrived at, in the beginning of 1860 I was asked to accompany Col. Smythe, R.A., F.R.G.S., on a mission undertaken for that purpose. Leaving Southampton on the 12th of February by the Peninsular and Oriental steamer, and touching at Mauritius, King George Sound, and Melbourne, I reached Sydney in April, and thence proceeded in the *John Wesley* to Fiji, a distance of 1735 miles—a free passage having kindly been placed at my disposal by the Australian Committee of the Wesleyan Missions. I first sighted the islands on the 12th of May, exactly three months after leaving Southampton, and saw the last of them on the 17th of November.*

* The information collected during that time has partly been printed in a Blue-book ('Correspondence relating to the Fiji Islands,' presented to both Houses of

The proper name of the islands is "*Viti*." In modern times they were first heard of in the Tongan Islands, the natives of which cannot pronounce a "v," and always substitute an "f" for it. The Fijians always speak of their islands as "*Viti*," and of themselves as "*kai Viti*," or men of Fiji. It is only in the eastern parts of the group, where there has been for a long time a strong Tonguese immigration, that the term "*Fiji*" occurs. As geographers have restored the native names of most of the groups of Polynesia, it is to be hoped that the more euphonious as well as more correct name of "*Viti*" will gradually replace the harsh-sounding and incorrect one of "*Fiji*."

Speaking generally, the Vitian Islands may be said to owe their origin to volcanic upheavings and the busy operation of corals. There are at present no active volcanoes; but several of the highest mountains, for instance, Buke Levu in Kadavu, and the summit of Taviuni, must in times gone by have been formidable craters. Hot springs are met with in different parts, earthquakes are occasionally experienced, and between Fiji and Tonga a whole island has of late years been lifted above the level of the ocean, whilst masses of pumice-stone are drifted on the southern shores of Kadavu and Viti Levu.

The deltas and alluvial deposits of the great rivers excepted, there is little level land. Most of the ground is undulated, all the larger islands are hilly, and the largest have peaks 4000 feet high; Voma in Viti Levu, and Buke Levu in Kadavu (both of which were ascended by us), being the most elevated. The soil is highly productive, and there is hardly a rod of land that might not be converted into pasture or be cultivated. Almost at every step one discovers traces that most of the land has at one time or other produced some crop. Though on the weather-side dense and extensive woods exist, few of them can be regarded as virgin forests, most having re-established themselves after the plantations once occupying their site had been abandoned. The re-establishment of the woods on ground at one time under cultivation can scarcely be adduced as a proof that the population has seriously diminished, but rather that the Fijians have for ages followed the same system of agriculture as they do at present, that of constantly selecting new spots for their crops when the old ones become exhausted.

The aspect of the weather-side of the islands is essentially different from that of the lee-side. The former teems with a dense mass of vegetation, huge trees, innumerable creepers, and epiphy-

Parliament by command of Her Majesty, May, 1862). The botanical results I am about bringing out in a quarto volume, illustrated by 100 coloured plates by Fitch ('*Flora Vitiensis*,' London, Reeve). The Narrative has been laid before the public under the title of '*Viti: an Account of a Government Mission to the Vitian or Fijian Islands*,' 8vo. London and Cambridge, Macmillan.

tical plants. Hardly ever a break occurs in the green mantle spread over hill and dale, except when effected by artificial means. Rain and moisture are plentiful, adding ever fresh vigour to and keeping up the exuberant growth of trees, shrubs, and herbs. Far different is the aspect of the lee-side. Instead of the dense jungle, interlaced with creepers and loaded with epiphytes, a fine grassy country, here and there dotted with screw-pines, presents itself. The northern shores of Viti Levu and Vanua Levu bear this character in an eminent degree, and their very aspect is proof that rain falls in only limited quantity, the high ridge of the mountains which form, as it were, the back-bone of the two largest islands, intercepting many showers, but sending down perpetual streams to fertilise the low lands of the coast. The lee-side would, therefore, more readily recommend itself to the white settler, as it requires hardly any clearing, and would be immediately available for sheep-runs, cattle-breeding, and cotton-growing.

The coast-line of most of the islands is encircled by a dense, more or less broken, belt of cocoa-nut palms. White beaches, formed of decomposed corals, may be traced for miles; whilst good soil in many instances extends quite to the water's edge, and trees, not numbering amongst the strictly littoral plants, overhang the sea. Mangrove-swamps are limited chiefly to the mouths of the rivers; hence the almost total freedom of the country from malignant fevers. In the windward islands, Lakeba and its dependencies, the weeping iron-wood, intermingled with screw-pines, abounds, and considerable tracts of the country are covered with our common brake and other hard-leaved ferns. The general physiognomy of the country is decidedly tropical; tree-ferns, bamboos, ten different kinds of palms, epiphytical ferns, orchids, and pepper-worts, fully accounting for this fact. Whole districts, however, have a strictly South-Australian look, and the mountains, above 2000 feet elevation, a vegetation peculiar to themselves. Nature has been extremely bountiful in distributing her vegetable treasures to these islands; but perhaps the best proof of their extreme fertility and matchless resources is less furnished by the fact that a country with at least 200,000 souls constantly supplies provisions to foreign vessels—having an immense number of cocoa-nuts withdrawn from consumption by a primitive and wasteful process of making oil for exportation, and cultivating, comparatively speaking, only a few acres of ground—than by the almost endless series of vegetable productions useful to man.

Sugar-cane, coffee, tamarinds, and tobacco are cultivated with success: 4 oil-yielding, 5 starch-yielding, plants, 4 different kinds of spices, 12 different species of edible roots, 11 pot-herbs, 36 edible fruits, an endless number of medicinal drugs, fibre-yielding, scent-yielding, and ornamental plants, and a long list of first-class

timber-trees, are amongst some of the productions of the islands. The sandal-wood, which first brought Europeans to these shores, has become quite extinct for all purposes of commerce; but some of the woods of Fiji are now regularly exported to the Australian markets, and fetch a high price. Yams hold the first place in the domestic economy of the Fijians, forming their staple food, and great attention is paid to their cultivation. Some of them are of such gigantic dimensions, that a single root would be large enough to feed twenty people. All vessels touching at the group lay in supplies of yams, giving calico, knives, axes, firearms, and powder in exchange.

If I understand the nature and requirements of cotton aright, the Fijis seem to be as if made for it. Cotton requires a gently undulated surface, slopes of hills rather than flat land: the whole country, the deltas of the great rivers excepted, is a succession of hills and dales. Cotton wants sea air: what country could answer to this requirement better than a group of more than 200 islands, surrounded by the ocean, as a convenient highway to even small boats and canoes, since the unchecked force of the winds and waves is broken by the natural breakwater presented by the reefs which encircle nearly the whole? Cotton requires further to be fanned by gentle breezes when growing, and rather a comparatively low temperature: there is scarcely ever a calm; either the north-east or the south-east trade-wind blowing over the islands keeps up a constant current, and the thermometer for months vacillates between 62° and 80° Fahrenheit, and never rises to the height attained in some parts of tropical Asia, Africa, or America. In short, every condition required to favour the growth of cotton seems to be provided, and it is hardly possible to add anything more in order to impress those best able to judge with a better idea of Fiji as a cotton-growing country of a high order. Although an introduced plant, cotton has become in some parts perfectly wild, and spread over all the littoral parts of the group. Six different kinds have come to my knowledge. In a small experimental plantation which I made at Somosomo, the seeds which I brought out from England, presented by the Manchester Cotton Supply Association, began to yield ripe pods after the first three months, and I was able to take home a crop raised from the very seeds I took out with me: it was the best New Orleans cotton, twelve pods weighing an ounce.

Politically, the Fijis are divided into a number of petty states, all of which are either tributary to Bau, or pay tribute to states so circumstanced. Bau owes its ascendancy chiefly to having been the first familiar with powder and shot. That event took place in the beginning of this century, and was brought about by Charles Savage, a Swede, whom some have supposed to have been one of a number

of convicts escaped from New South Wales, but whom Captain Erskine has ascertained to have been an honest sailor. That he was a shrewd man, to whom all the whites then in the group looked up, is generally admitted. He was at once acknowledged a great chief at Bau, and married into several of the highest families. Had his offspring lived, they must have become the rulers of the land, as the rank held by the mother descends upon the child, even if the father should be a man much below her in social station. Charles Savage seems to have known that he could never aspire to the highest honours, but he fully hoped that his children might. In this hope, however, he was disappointed. No sooner were his children born, than by a tacit understanding between his wives and the ruling chiefs they were all put to death, and he died childless and without handing over the country to the white race, as seems to have been his intention to do. But it was not solely to firearms that Bau owed its permanent ascendancy. Like England, but on a Lilliputian scale, it is a great naval power, able to send its fleet of war-canoes, some of which measure more than 100 feet in length, to any part exhibiting signs of disaffection, and to this day Bau "rules the waves" around all the islands you see on that large diagram before you.

One of the pictures exhibited, painted by Captain Wemyss Anderson, represents Bau in 1860. The town looks now very different from what it did before the introduction of Christianity. All the large heathen temples, which by their pyramidal shape gave a peculiarly local colouring to old pictures of the place, have been destroyed, and only their foundations remain. The top of the island, where you see the British flag waving, was formerly a mere receptacle for rubbish; but by the industry of the Wesleyan missionaries it has been converted into smiling gardens and eligible sites for dwelling-houses. Not without emotion did I land on this blood-stained island, where probably greater iniquities were perpetrated than ever disgraced any other spot on earth. The ovens in which human bodies were baked hardly ever grew cold. It was about eight o'clock in the evening when I stepped on shore, and, instead of the wild noise that greeted former visitors, family prayers were heard nearly from every house. To bring about such a change has indeed required no slight effort, and many valuable lives had to be sacrificed; for, although no missionary has ever met with a violent death from the hands of the natives, yet the list of those who have died in the midst of their labours is proportionally great. The Wesleyans, to whose disinterestedness the conversion of these degraded human beings is due, have, as a Society, expended about 75,000*l.* on this object; and, if the private donations of friends to individual missionaries be added, the sum swells to the respectable amount of 80,000*l.*

The religion which Christianity is endeavouring to supersede, and has superseded in all the smaller islands and the coast districts of the two larger, is fully deserving of philosophical study. Its cardinal points are, the belief in one great Being, the Creator and Governor of the World, called Degei, the immortality of the soul, future reward and punishment, and the worship of ancestors. There are no idols or images of any kind. Degei, the Supreme God, identical with Tangaroa or Taaroa of other parts of Polynesia, is supposed to reside at Na Vatu—a mountain on the northern shores of Viti Levu—the Fijian Mount Olympus. His sway is universally admitted in all the islands, whatever the local gods may be. Only in some islands temples are erected to him, which, like those devoted to the minor gods and ancestors, are of pyramidal shape, and placed on the top of terraced mounds. The nearest approach to them I can find is presented by those of ancient Mexico and Central America: indeed the Fijian temples may be said to be indifferent copies of these. The strong conviction the natives entertain of a life hereafter is the real cause why at the death of a man his wives are strangled, so that they may follow him to the region of bliss. The spirits are supposed to take their departure from the extreme west end of Vanua Levu; in which respect the Fijians agree with most Polynesians, including the New Zealanders, that their souls are believed to take their departure always from an extreme western point. In their worship of ancestors the Fijians agree with the Japanese, Chinese, and Kaffir tribes of Southern Africa, and in a modified sense with ourselves, who, though it may not be quite orthodox, are quite willing to allow, under the garb of poetry, that departed parents kindly watch over the poor orphans whom they left behind.

The people of Bau are a very fine race, nearly all chiefs or members of noble families. Most of them are over 6 feet high, well proportioned, and often of a handsome cast of countenance. In Fiji a man is estimated by the height of his body, and little men are regarded with great contempt: our authorities at home would do well to mind this fact in the selection of any officers they may send out. In a measure this is explained by the fact that here as all over Polynesia the chiefs and upper classes are as a rule considerably taller and of superior mental development to the people they rule. They know every plant, animal, rock, river, stone, and mountain; are familiar with the history of their country and its legends; very strict in observing every point of their complicated system of etiquette; they can row, sail, swim, and fight, and build houses and canoes better than the common people, and are first-rate agriculturists. It is thus that, amongst a people not able to fall back upon dress and finery to lend distinction to rank, dignity to station, they manage to keep

their position and enjoy its advantages, as they fully deserve to do.

In case the Fijis should become a European colony, Bau will not remain the capital. It is built on a small island, and quite unsuited for an active commercial intercourse. In the islands the question is much debated what place would have the greatest claim to that distinction. I heard of four, viz., Galoa Bay, Levuka, Port Kinnaird, and Suva. Galoa Bay is on the southern side of Kadavu, with a beautiful harbour suitable for the largest ships, and easy of access. It has been surveyed by Mr. Pritchard, and will doubtless be taken advantage of when the projected steam-communication between Sydney and Central America starts into life. But Kadavu is too far away from the body of the group to offer a fit place for the new capital. Levuka has always been a favourite resort of the white population, and it has a tolerably good harbour, accurately surveyed by Capt. Denham; but there is no room for a town. Rocks rise almost from the water's edge, allowing only one row of houses to be built; and unless a series of works are commenced, similar to those which make Valetta a city of terraces, there is no hope of making Levuka anything but a trading village. Port Kinnaird is the next place which puts in a plea. It is a fine port, perfectly landlocked; and if a portion of Moturiki could be devoted to a site for a town, it would speedily rise in importance. The settlement which Mr. Pritchard has started is on the island of Ovalau, opposite Moturiki, and would probably have a good chance if its advantages were not totally eclipsed by Suva, in Viti Levu. So convinced has every one able to form an opinion become that Suva will be the capital, that the land around the harbour, worth recently a few pence per acre, has now risen to 20*l.* per acre: 10*l.* I saw actually refused. And yet nothing has been done to bring about the change. The general conviction that Suva *must* be the capital seems to have done it all. The advantages offered by this place are really great. Here you have a good harbour, mud bottom, deep water right alongside of the shore, sheltered by a reef, and having a passage for the largest vessels to beat in and out. When once outside the passage there is clear sea-room—no outlying shoals and reefs. Suva commands besides the largest agricultural district in Fiji, through which run fine rivers, navigable by boats for many miles inland, having outside reef-communication completely round Viti Levu, with the exception of a few miles on the southern shore and the westward, and continuing to the northward to Vanua Levu, and along the entire southern shores of that island. The convenience of inside reef-communication is demonstrated by parties employed in sawing timber. Logs are purchased at a distance of 40 miles from the sawing-pits and floated up by natives at a trifling cost. Were there no reef, this would be a

matter of impossibility. Suva Point is a gently undulated country, free from swamps, and about 3 miles wide or thereabouts at the base. It has on one side Suva Bay, and on the other Laucala Bay—the latter also an anchorage, with many conveniences. The Point itself is open to the prevailing winds, and thinly timbered with bread-fruit, cocoa-nut, dawa and other trees, of no great growth, and easily cleared off.

From Bau we proceeded to Rewa by way of the Rewa River, and a canal made by the natives, cutting short a long sea-passage around the south-eastern portion of Viti Levu. It being ebb, we went by boats; but our schooner, the *Paul Jones*, was successfully taken through the canal at full tide. Gales and heavy rains detained us longer than we expected at Rewa, where a meeting with the chiefs was held. Thence we passed southwards to Kadavu, anchoring in Tavuki Bay, the geographical position of which has lately been ascertained to be in lat. $19^{\circ} 3' 9''$ s., and long. $178^{\circ} 6' 23''$ E., by Mr. Sedmond, Master of H.M.S. *Harrier*, Captain Malcolm M'Gregor. We found there three large American whalers, who had put in for wood, water, vegetables, and pigs. They expressed themselves much pleased with the abundant and cheap supplies here obtained, and said they would henceforward always come to Fiji, in preference to any other groups, where the charges had of late become exorbitant.

Kadavu is a beautiful island, and, except perhaps around the summit of Buke Levu, its highest mountain, nearly everywhere cultivation or traces of former cultivation could be seen. We crossed over the Isthmus of Yarabale to Galoa, or Black Duck Bay; our boats being hauled across by the same contrivance the natives employ in getting their canoes across. Galoa Bay would be eminently useful if a steam-communication should be established by way of Fiji. There is a reef outside, with several passages through it, acting as a natural breakwater. We made two attempts whilst at Kadavu to ascend Buke Levu; but heavy gales and rains frustrated our attempts. Some weeks later, however, Mr. Pritchard and I reached the summit; and, as the first Europeans achieving that event, left a bottle, which those who may follow our footsteps are at perfect liberty to uncork in order to familiarize themselves with its contents.

From Kadavu we crossed over to Navua on Viti Levu, situated on the river of the same name, which comes from the north, and has never been explored by any European traveller. There are several deltas at its mouth, the largest of which, called Deuba, is full of fine groves of sago-palms (*Sagus Vitiensis*, Wendl: a species quite new to science). Mr. Pritchard and myself had previously visited this place, and made every arrangement with Kuruduadua, the ruling chief, a man more than 6 feet high, for penetrating

into the interior. We anchored the *Paul Jones* off the town of Navua, which is about 4 miles up the river, and on its right bank. It had been burnt a few years previously by the Americans, and now consisted of about 80 houses. There was no temple in the town; but a very large one was seen a little distance up the river.

Chief Kuruduadua was very glad to see us again, and so were the people. He had faithfully kept the promise we extracted from him previously, not to allow any more eating of human flesh in his dominions. The large iron pot, to which Dr. McDonald alluded in the *Journal* of this Society,* was quite rusty, and had evidently not seen the fire since our last visit. Kuruduadua had not as yet been accessible to missionary influence, and was still a heathen; but he was tolerant in his religious views, and rather favoured than hindered the spread of Christianity amongst his subjects. On Sunday morning I heard him asking two men whether they were Christians or not: on their replying in the affirmative, he reprimanded them for not attending Divine service, as the drums, the substitutes for bells in these parts, had left off beating some time. These drums are made of hollowed trunks of trees, and can be heard a great distance off.

We started for the interior on the 21st of August, early in the morning; all embarked in canoes, and accompanied by Kuruduadua. For some miles we passed a rather flat country, dotted with villages and temples, the banks of the river being lined with feathery bamboos and sago-palms. Gradually the scenery became bolder: rocks rising to the height of 300 feet; waterfalls, looking like so many streaks of silver, became numerous; and splendid tinted trees abounded. We had to cross several rapids, and at one of them one of our canoes was carried away, dashed against the rocks, and lost its outrigger: the luggage was saved. Judging from the dead leaves and twigs observable in the crowns of the trees, the Navua must be navigable for even large boats during the wet season.

Towards dusk of the first day we came to a part where the river had been blocked up by large masses of rock, thrown down, the natives assured us, about 50 years ago by a great earthquake. Here we had to leave our large canoes and take smaller ones, which carried us to Nagadi, a considerable town, where we remained for the night; and where pigs and innumerable yams and taros had been packed for our benefit and that of our large flock of attendants.

The next morning we again took to our canoes, and about noon finally left them to proceed on foot to the town of Vuni-wai-vutuku, and thence to Namosi, the capital of Kuruduadua's dominions.

This place had been reached a few years before by Mr. Waterhouse and Dr. M'Donald, from the east; we now reached it from the south, thus connecting our mutual discoveries. Voma Peak, a mountain about 4000 feet high, was ascended by us; and, from angles taken at its summit, its position has been laid down, and the westward course of the Wai-dina, or THE river of Viti Levu, as given in the Admiralty Chart, shortened about 20 miles.

From the top of Voma we could plainly see Moturiki, Batiki, Gau, Bega, Yanuca, and Ovalau; even Kadavu was looming in the distance. As far as the eye could reach over Viti Levu, we beheld nothing but a succession of hills and dales; nor did we see any higher mountains than the one we had ascended. People on the coast assured us a large plain, a kind of tableland, existed in the centre of Viti Levu; but repeated inquiries led to no satisfactory result. The natives owned there were several fertile valleys of considerable extent; but nothing came up to the description given to us, on the coast. They had heard, however, of a lake on which canoes were.

Namosi is situated in a lovely valley, very much reminding me of Ischl. The Wai-dina is now, during the dry season, a mere streamlet; a man has no difficulty in wading through. The banks are lined with shaddocks, Seville oranges, and palm-trees; and the valley is cultivated with many sorts of bananas, yams, and taros. The hill-sides would be well suited for tea and coffee.

The political meeting at Namosi was highly interesting from the large body of people flocked together. Kuruduadua enumerated a great number of tribes under his sway, some of whom were quite unknown to us even in name. The dominant tribe, he represented, had gradually fought its way to the southern coast of Viti Levu, and Namosi was still regarded as its capital, though Kuruduadua usually resided at Navua. There was no trace of European culture or training visible amongst the assembled masses—all the men being in an almost absolute, the boys in a perfect state of nudity—often painted red and black, and their hair done up in many different and extraordinary ways. Among those assembled was an old man, who had seen *five* generations of Kuruduadua's family, and had *great-great-grandchildren* then living, the eldest of whom, a fine boy, was 10 years old. Another man, who was living with him, had seen *four* generations of the same family,—not a bad proof of the fine climate of Fiji, or the physical constitution of its inhabitants.

The people were seated in a semicircle; Kuruduadua and his councillors on the steps of the *Buri-ni-sa*, or Town-hall. He said that he and his people had made up their minds to "lean upon England," as he expressed it, in the manner agreed upon with Mr. Consul Pritchard. This was, probably, the most satisfactory

meeting I attended. All the others were held on or near the coast, and it might be said that fear of British men-of-war made the natives so unanimous in ceding their country, and ratifying the cession with alacrity: but here was a powerful people, in the very heart of the mountains, who, if they choose, could hold out against almost any large force, and who cheerfully offered to transfer their rule to England.

While my companions had left for the coast, I remained behind at Namosi to investigate the neighbourhood, and pick up what information I could about a people who—strange paradox!—sat down to cry when we departed, and yet had the bones of those eaten at cannibal feasts suspended in the trees! I soon gained their confidence, and they allowed me to pry into all the ins and outs of the place. Their reluctance to impart information about the cannibalism they practised soon vanished: I even got them to fetch me the vegetables eaten with *bokola*, or dead man, and the peculiar kind of tomato (*Solanum anthropophagorum*, Seem.) of which the sauce is made. In Europe I had heard it as a popular anecdote that cannibals object to us white folks because we taste salt; but I found that the Fijians eat salt with human flesh as they do with any other meat. Again, whilst they eat all other food with their fingers, human flesh is only touched with wooden forks having three or four long prongs. Great objection is manifested to any of the forks being seen, and they pass as heirlooms from generation to generation. All these forks have names, often obscene ones, and I had some difficulty in obtaining a few specimens for my ethnological collection.

From what I could learn, it requires a strong digestion to partake of human flesh; and the widow of the late Governor of Namosi assured me that her husband, the notorious Na Ulumatua of M'Donald's narrative, would be still alive if he had been able to refrain from it. But people—never mind where they live—have to make *some* concessions to the circles in which they move; and he, poor fellow! had to partake of bodies slain in battle, or in a rebellion, as a matter of course, as a duty he owed to society. This brings me to the real drift of the cannibalism as practised in Fiji. The lower classes and women do not participate in it—only the upper and chiefs; and they do it, not because they have a weakness in that direction, but simply to exhibit the essence of revenge and punishment. To say to a Fijian "I will eat you," or remind him of any of his relations who may have shared that fate, is the greatest insult one could offer.

One day I was asked to see the "crown jewels." They were kept in a wooden box, in charge of the widow of the late Governor of Namosi. First, there was a necklace made of whales' teeth, the first that ever came to these mountains; secondly, a large

whale's tooth highly polished, and carefully wrapped up in cocoa-nut fibre (whales' teeth are in Fiji what diamonds are with us); thirdly, a cannibal fork in the shape of a club, and bearing the name of "*Strike twice*," i. e., first the man, and then his flesh. A lot of other crown property had been burnt when the Americans some years ago destroyed Navua. A short club, which would kill a man when thrown at him, and was never known to miss, formed part of this precious collection.

The natives were extremely kind to me, and did everything to please me. The Governor of Namosi, Kuruduadua's brother, prided himself, and not without reason, upon his cookery, and would make me puddings with his own hand; every day a different sort. The Fijians occasionally prepare monster puddings, 20 feet in circumference. In the evenings I was entertained with Fijian tales, some of which I wrote down. As the Court was still in mourning for the late Governor, the natives were sorry they could not get up any dances, or else they would have been most willing to do so. Finally, I was asked to marry and settle in the town; and when telling them that I had already entered that happy state, I was informed that the ladies who courted my alliance would not object in the least to be second or third.

I escaped these and similar temptations by returning to the coast, accompanied by a large body of natives. A young chief, who had become much attached to me, and followed me like my own shadow, went on board with me and begged hard to be allowed to go with me to my native country. I had the greatest difficulty to dispel the illusions he entertained about Europe. I told him that in Fiji he was respected, prosperous, and happy; and I could not promise him the same in Europe, where all, except a favoured few, had to work hard in the grand struggle for competition; that he would have to pay high for clothing, shelter, food, and fire; all of which he either did not want here, or had in abundance. He remained with us till we hoisted sail, and then stepped into his canoe, quite heart-broken with disappointment.

From Navua we went over to Bega, once more to Kadavu and Ovalau, and thence around Vanua Levu, and part of Taviumi. I paid another visit to Somosomo, where I had been a month after first landing in Fiji, and where I found my cotton plantation in a highly flourishing condition.

I finally left Fiji on the 18th of November, 1860, and returned to England in March, 1861.



Map to accompany a
Journey from Zululand to Zoutpansberg,
in 1855-6.
to which is added the parts of
South Africa adjacent.
by
James M. Queen, Esq. F.R.G.S.

Route of Embassy inland

V.—*Journey from Inhambane to Zoutpansberg, by JOAQUIM DE SANTA RITA MONTANHA.** By JAMES MACQUEEN, Esq., F.R.G.S., &c.

THIS remarkable journey was performed by an embassy sent from Inhambane, on the east coast of Africa, lat. $23^{\circ} 51'$ s., long. $35^{\circ} 20'$ E., to the settlement of the Dutch Boers at Zoutpansberg (Salt Hill), at a little distance—say forty miles—south of the Limpopo, or Ouro, in about lat. $22^{\circ} 50'$ s., and long. $29^{\circ} 35'$ E. This embassy was ordered by the Portuguese Governor of Inhambane, and was placed under the superintendence of a Roman Catholic clergyman, a European, accompanied by some Arab merchants, a Russian, and some slave-traders. The party left Inhambane on the 25th May, 1855, nearly the close of the wet season in these southern latitudes. Besides fifty-four negroes, it was accompanied by several parties as servants. Leaving Inhambane, they proceeded across the river one day to Mango; from whence they journeyed one day to Morumbane. In one day, going west, they reached Guione. Proceeding first north-west one day, and then passing the little river Quingulo, they came to Carube of Ingoane. From thence they pursued their way in a south and south-westerly direction, and, passing several lakes each day, they fixed their encampment amidst brushwood. Here they turned north-west, in which direction they continued for eleven days, almost daily passing by lakes, and occasionally crossing hills. On the fifth day on this bearing they crossed the river Luize. Here they quitted the lands of Maxiva, and entered upon those of the powerful state of Chicualacoalla. On the third day thereafter they saw, on their left hand, water, said to be the river Sangute. One day more and they reached Chiquita. In two days more they reached Madiacune, from whence their course was west. On the first day's journey in that direction they travelled in the lands of the Maloios, and came near the great river Bembe (or Rio del Oiro, or Ouro), and in the next day, going in the same direction—namely, two days west—they crossed the river Bembe at a ford. The stream came from the north, and ran with a strong current. From the river they ascended the land to the south, and encamped at the close of the day at the town of Chicandana, amongst the cultivators or peasants subject to Manicusa. This state, or the capital of it, lay at some days' distance from the point where they first reached the river Bembe. They pursued their journey one day north-west by the side of the river Bembe, after which they

* It is greatly to be regretted that the diary of this interesting journey has not been faithfully rendered into English, without note or comment, and accompanied by a copy of his own map in detail.

Those who examine for themselves will possibly arrive at conclusions somewhat at variance with the geographical views contained in these pages. J. A.

proceeded one day north; from which point they kept a direct west course for thirteen or fourteen days to Zoutpansberg.

In the journey to the Bembe the country crossed was generally open brush, without any particular mention of hills; and the lands a good deal cultivated by the Landeens, or agricultural labourers belonging to the chief men of the different states. There were numbers of elephants, many cattle, a good deal of country provisions, water-fowl and great numbers of fine geese on the different lakes passed on the road. It was now the end of May, and the rivers subsiding after the rains, and the land beginning to be tolerably dry.

The distance travelled in the direction, north-west, will be 130 geo. miles, as the days' journeys were long, exceeding eight hours. To the most northern point is a distance on the northerly bearing 120 miles, bringing the advance to about lat. $22^{\circ} 20'$.

From this extreme point north they pursued their journey west fourteen days to Zoutpansberg, a distance of at least 150 geo. miles. On the second day they crossed a small river, and on the eighth day they crossed in the morning a small running river, and in the afternoon a large river: there divided into three channels, with a strong current; its bed full of large smooth stones. Next day they crossed the river Tave, which had a strong current. Between the great river and the Tave they came in sight of a river to the north, with a great current, which could be no other than the Bembe, or Limpopo. In all this line of march they encountered hills, ascending and descending them nine and ten in one day, most of them strewed with stones, and their path also covered with them, but otherwise open and unobstructed. They met herds of camelopards and other wild animals, and passed numerous lakes, some of them no doubt the remains of the inundation. Beyond the Tave they entered the state of Fera, where they were well received. Every day they passed and slept in towns or villages of the cultivators, and readily procured the supplies they required. It was now the end of June; the days were generally clear, but in others the sky was quite covered with clouds, and the country sometimes enveloped in mists and fogs. In the end of June and the beginning of July the cold, especially during the nights, was very great, and the water and streams hard-frozen every morning. As they approached Zoutpansberg, they crossed many small rivulets or streams. In Fera they found a large town built on a mountain, the dwellings in rows or terraces rising one above the other. In Fera also they found the cows exactly like those of Europe. On the 5th of July they reached Zoutpansberg, where they were received with great satisfaction and great honour and respect, and entertained most hospitably. They were also met in their march, at a considerable distance from head-quarters, by parties of the Dutch population with welcome, and supplies, and conveyances.

S. J. Schorman was general and commandant of the district, and with him and the other authorities they negotiated very readily treaties of peace and commerce in the month of August, 1855. At this place they remained till the 23rd of June, 1856. During the interval they visited Waterberg, a considerable Boer settlement, nine days distant. During their stay at what may be termed the capital of this quarter of the republic, they were entertained at many festive parties and dances.

Assuming that Inhambane is in $35^{\circ} 20'$ E. long., Zoutpansberg will be in about $29^{\circ} 30'$ E. long., and about 30 miles south of the Limpopo, or Ouro, or Oiro.

Although it was their winter season when the embassy reached Zoutpansberg, still the country must be greatly elevated to have had the cold so great within the tropic of Capricorn. In the distance they saw very high mountains, in all directions—north, north-east, and south-east. Towards Delagoa Bay, we know that this is the case from other and good authority. In a journey undertaken from Lourenço do Marquize or Delagoa Bay, in 1847, to Origstatdt by a party of Portuguese, they state that the distance was in a direct line almost 80 leagues (but 120 by the circuitous road), and that they had to go across immense mountains, infested with the Tsetse, but that more to the north there was an easier road.

The magnitude, course, and source of the Inhambane River are points deserving notice as connected with this subject. Its source is estimated by De Lisle to be 130 miles distant, and the bearing of its course north-north-west from the town of Inhambane. The river is only navigable for ships to a distance of 9 miles, and boats about 5 miles farther. The native name appears to be Moviembene. The Luize is an affluent of it. An inspection of the map will show that the bearing and distance of its course and source cannot be materially incorrect. The Bembe, or Rio del Oiro, or Ouro, is therefore most probably the river Limpopo or Ouro, as it is also called, the mouth of the Rio del Ouro, marked and known in every map of Eastern Africa in lat. $24^{\circ} 43'$ S., and long. $34^{\circ} 15'$ E. At its mouth it is 1 mile broad, but it has never been minutely examined, nor the country around it. The ambassadors alluded to expressly name the stream the Bembe or Rio del Oiro, and add that it is also known as the River of Crocodiles. Mr. McCabe also mentions that such was its name (Ouro) and designation where it bursts through the Cashan Hills in its course northward and eastward. The Dutch Boers distinctly told Dr. Livingstone * more than once that the river Limpopo entered the sea under its native name Ouro, and at some distance to the north of Delagoa Bay, but not in it. So also other authorities tell us, and assure us that the river cannot

* Letter, Livingstone to Oswell, 7th Sept., 1846, &c.

reach the Manice, or St. George River, asserted by some to be its mouth. The river Inhampura would intervene with its course; but it is not so. That mouth is, however, formed by the Elephant River and the Omekonto, and other rivers that descend from the northern parts of the Dragenberg. The course of the Elephant River is at least 460 geo. miles, and through a very mountainous country, abounding in streams, and therefore with its numerous tributaries brings a supply of water equal to form the Manice. This river, according to Owen, is at 50 miles from the sea, $25^{\circ} 27'$ s. lat., 120 feet broad, 18 feet deep, with a current of $1\frac{1}{2}$ miles per hour. At 35 miles to the westward the Manice, according to the same authority, breaks through the formidable chain of mountains which traverse that portion of Africa. The Rio del Ouro, or Gold River, therefore, is the probable mouth of the Limpopo River, and has no connection with Delagoa Bay. Mr. Baines also shows and states this (*Geo. Journal*, vol. xxiv., p. 291). The real name of the Elephant River is the Pellulah or Lepulula. The name Manice may be derived from Manikos, a chief that dwells on the lower part of that river. The Bembe, or Rio del Oiro, which is the Limpopo, is, therefore, though not quite certain, not the principal affluent or parent stream of the St. George River.

The Inhambane embassy do not seem to have been troubled with mountains in their advance to the north-west; but from the extreme point gained in that direction, they in their future progress found the country exceedingly hilly, mountainous, and stony, and the cold exceedingly severe. Mr. McCabe and others tell us that to the south of the middle course of the Limpopo the country is exceedingly mountainous. To the northward it is still more so, the hills in about the parallel of 20° s. rising to the elevation of 8000 feet; and about the sources of the Sabe it is stated that they are sometimes to be seen covered with snow.

On the return of the embassy, the party crossed the Bembe at the end of fifteen days' march, being one day more in the distance from Zoutpansberg than in their advance, from which it would appear that they recrossed the stream lower down, and where they say it ran in two channels, with a strong current in each. Perhaps they took the road through the country of the Manicussa, or Manicurassa, which they in one place distinctly state to be the nearest.

In concluding the journey, the ambassador gives us a good deal of curious and interesting information regarding this advanced Dutch settlement, its population and produce, showing the advances made and making in civilization and industry. On these important points we have been left greatly in the dark by English authorities, while by some of these the characters, manners, and pursuits of these pioneers of South African improvement have

been grossly misrepresented. It is pleasing, therefore, to find a foreigner, and a Roman Catholic, speaking of these Protestants in the way that he has done.

Zoutpansberg, or Salt Mountain, is so called from the quantity of salt that is found in it. Many rivulets descend from it. The population are all industrious, and every one labours with his or her own hands. The females perform all the domestic work, and are also seamstresses and tailors. They make all the clothes for the males. The men are carpenters, masons, shoemakers, tanners, blacksmiths, saddlers, and some of them servants. The streets of the town are at right angles, and are of a good breadth. They are kept clean, and have rills of water running in them. No one is allowed to throw any dirt upon them, nor are pigs or cattle permitted to run about in them. There is a neat church, with considerable accommodation; it is covered with straw. The Sabbath is strictly and religiously observed. The population consume flesh and bread, and coffee is taken at all hours of the day. The number of dwellings is 278, accommodating a population of about 1800 souls, of which 300 or more are fit to bear arms, and liable to serve in defence of the country, from seventeen to twenty years of age. Each soldier, when called to active service, is obliged to provide a horse, or ox, and a cart. They consume nearly 22,523 lbs. to 25,000 lbs. of gunpowder, 40,000 lbs. of lead, 4000 lbs. to 5000 lbs. of coffee, and 10,000 lbs. of sugar. Little tea is used. They export 200,000 lbs. of ivory. They produce and export wheat, barley, rye, French beans, broad beans, maize, manna, &c.; also spirits, honey, dried fruits, tanned skins, dry salt, rhinoceros' horns, sea-morse teeth, ox and buffalo horns, boards and planks, butter, cheese, orchilla weed, garden parsley, sawed timber, &c. They have peach-trees, figs, apples of all kinds, limes, oranges, walnuts, almonds, quinces, chestnuts, apricots, bananas, grapes, and palm-trees. They have one judge, with a salary of only 100*l.* per annum, and some income from fees!

In conclusion, it would appear from the narrative that on their return they passed the Bembe a little to the south of the road by which they advanced, as at this point they found the river in two channels, with much water, and a considerable current, whereas on their advance they found the river where they crossed it in one deep channel. On the day following, after they had crossed the Bembe, they reached and crossed the river Meneze, and in the evening of the same day they reached a town of the kingdom Chicualacualla, the territory of which kingdom begins at the left bank of the Bembe. At the town mentioned they procured guides for their forward journey. With little wind, the weather here was clear and cold. Advancing, they traversed the country

of Quamitoassimba and Boeetha. On the middle of the eighth day from the river Meneze, they reached and crossed the river Luize, the water of which was brackish, with several salt-water lakes around and eastward of it. Near it they had the sky covered with heavy clouds, from which heavy rains descended. Having crossed the Luize at a place which had much mud and many reeds, they travelled for four days along its left bank, nearly always in sight of it (crossing and recrossing it repeatedly), when they again crossed the stream to the right bank. Here the stream was of a considerable breadth; and, from the bearing in which they travelled, it is clear that this river is a branch of the Inhambane river, if not in reality the main branch of that river. This part of their journey from the Meneze to Inhambane took place in the month of July, and consequently after the conclusion of the rainy season. On the seventeenth day from the river Meneze, they traversed the small state of Mazeba; on the nineteenth day they reached Ingoana; on the twentieth day they reached Maunduene; and next day, Bytinga, near the Inhambane river, which they subsequently crossed at the point where their advanced journey began. The country from the place where they first started seems to have been, generally speaking, plain, with a few shrubs and brush, and a good deal cultivated by the Landeens, or native agricultural labourers. They found provisions readily, and had no trouble whatever with either chiefs or people in passing through the country. The districts around the Bembe had iron and copper in great abundance. The party returned to Inhambane on the 1st of August, 1856, after an absence of fourteen months.*

VI.—*Description of the Ruins of the Acropolis of Cassope, in Epirus, 15 miles north of Prevesa. 1860. By Lieut.-Colonel COLLINSON, R.E.*

Read, May 12, 1862.

THE village of Camarina and the monastery of Zalongo are situated on the most southern of the Suli range of mountains, which is detached from the others and overlooks the sea on the

* The Map accompanying this Paper is drawn upon the given bearings, and on estimated distances; but when checked by journeys from the opposite directions, and from accounts lately received, it would appear that the route must have been a little more southerly. This will bring Zoutpansberg to be some distance more to the south and the west than where it is placed.

Moselekatse's present capital is, from actual astronomical observation as regards latitude, in $19^{\circ} 58' 58''$ s.

The cold, after the embassy passed the Bembe, was found to be exceedingly severe; the streams and rivers being covered every morning with thick, compact ice. Even with warm clothing the cold during the night was scarcely bearable.

west hand and the Gulf of Arta on the east. The summit of this mountain is about 2000 English feet above the sea, and is a narrow rocky ridge lying east and west for a length of a mile, and falling steep on all sides; especially to the south towards Prevesa and Arta, on which side the mountain falls in plateaus edged by perpendicular cliffs of rock. Below the level of these plateaus the lower slopes stretch away to the site of the ruins of Nicopolis, at an average level of about 200 feet; and from Nicopolis to Prevesa the ground, like the shores of the whole Gulf of Arta, is a level plain.

From Prevesa to Nicopolis is 3 miles; from Nicopolis to Camarina, 12 miles.

The summit of this detached mountain has been in former times the Acropolis of a numerous and civilized people. No doubt the whole summit has been more or less inhabited; but the actual Acropolis enclosed within walls has been apparently on the first plateau, on the south side, 100 to 200 feet below the crest. This plateau is about 1000 yards from east to west, and 200 yards broad, comparatively level, sheltered towards the north by the cliffs and steep slopes of the crest of the mountain, bounded to the south by precipices falling 100 feet perpendicularly. The mountain and the plateau covered with buildings must have been a conspicuous object from the whole Gulf of Arta, and from its position and strength was probably an important fortress of the Epirote nation, as the celebrated Levantine traveller Colonel Leake supposes it to have been. The plateau and the summit of the mountain are shown upon the accompanying sketch-plan, which has been made partly from Colonel Leake's '*Travels in Greece in 1804*,' and partly from rough measurements taken by myself during my visit there in March, 1860.

On the south side of the Acropolis, along the edge of the precipice, the foundations of the wall can be traced at intervals; also along the eastern side facing the monastery of Zalongo: along the western side the wall is more perfect, standing in some places 15 and 20 feet high, and 10 to 15 feet thick. The whole of this wall is built of polygonal masonry without any mortar; there are no horizontal courses and no rectangular stones: the stones are not large, being on the average about $3 \times 2 \times 1\frac{1}{2}$ feet, those in the centre of the thickness being smaller. It follows the crest of the hill; but advantage has been taken of every turn in the ground to obtain flanks. In one of these flanks is a small arched gateway, 4 feet wide, the roof of which is formed by horizontal blocks of stone, the under sides of which are cut to the curve; two, meeting in the centre, span the opening. The wall is thicker at this gateway, but there is no appearance of the square towers mentioned by Colonel Leake. It was probably a principal entrance; the easiest

path to the Acropolis at this day being up a small ravine on the western side, between the west wall and the overhanging cliff of the crest.

The remains of the wall are also found on the ridge of the crest behind the Acropolis, the ridge being so narrow in some places that the wall occupies the whole breadth of it; in this part of the wall the stones are larger, still polygonal and fitting closely. I saw nothing of the large gateway at this part, mentioned by Mr. Hughes, who was here in 1812.

The whole of the plateau within the walls, and which is comparatively level, is covered with the foundations of buildings so thickly that the streets were apparently not more than 10 to 15 feet wide. The houses and streets are all parallel or at right angles to each other. The foundations are nowhere above 3 feet high, some of polygonal masonry, in the larger buildings of squared masonry; many blocks of stone 3 and 4 feet long, squared on all sides accurately though not finely, and with the arris or edge carefully finished as in old Greek masonry. On the most level part of the west side are the foundations of a building, 100 feet by 120 feet, apparently containing a court-yard, 75 feet square, and a passage along the west front. On the most level part of the south side, commanding the finest view of the country below, are the foundations of a building or enclosure, 90 feet by 120 feet, with a gallery or terrace along its south front on a level a few feet below the main-floor; and another gallery in front of that again, on a still lower level, and marked by eight squared stones at regular intervals of 15 feet. The width of both galleries or passages is 15 feet. The stones are 2 feet square, and have each two mortise-holes cut in them. If they have been the bases of columns, they are about double the distance apart of the Ionic octostyle for 2-feet columns; but there is not a fragment of a column visible. The main walls of this building are of squared masonry, the terrace-walls of polygonal.

All these buildings are parallel to each other, and nearly facing the cardinal points of the compass; though this may have been accidental, as it also conforms to the contour of the ground. The ground inside the different buildings is smooth and level, but there is no appearance of any flooring, though it must have been above the present level of the ground, as the live rock frequently crops out. There is enough broken red-tile to justify the supposition that many of the roofs were so covered; it is the flat Roman tile with one thick edge.

The only buildings not conforming to the general parallelism are the two theatres and an underground chamber, called by Colonel Leake, and still called, "*Vasilospito*," or King's-house. This latter is in the south-west or most exposed angle, and consists

of a chamber about 10 feet square and 6 feet high to the spring of the arch, covered with a cylindrical vault; the stones of which are not laid horizontally, as stated by Colonel Leake, but are regular voussoirs cut to the curve, three and four stones forming the span. The stones lying on the roof outside are evidently voussoirs of a similar arch, and not "stones of a circular building 10 feet diameter," as Colonel Leake supposed. The ground outside the chamber is at present on a level with the top of the roof of it; the descending passage into it, 5 feet wide and 20 feet long, is also arched, but with stones laid horizontally and cut to the curve as in the gateway. Both the chamber and the passage have been coated inside with a fine hard smooth plaster, moulded into cornice and panels, a great part of which remains good, and showing traces of colour. It is supposed by Colonel Leake and Mr. Hughes to have been a tomb; the voussoirs outside and the appearance of the ground indicate that there are others near the same spot. It would be interesting to ascertain the date of these tombs, as they may be the oldest examples of the regular arch known.

The largest theatre is at the back of the plateau, excavated out of the steep side of the crest of the mountain, and is thus described by Colonel Leake:

"The interior diameter is 50 feet: the rows of seats, which are thirty-seven in number, are divided into two compartments by a *præcinctis* or *διάζωμα*; the lower containing twenty-four rows, the upper thirteen. The *cavea* is greater than a semicircle, and is divided into *cunei*, separated by steps. The outer circular wall of the *cavea*, and those which support the two extremities, are built of polygonal masonry, without any squared stones."

The Rev. Mr. Hughes also gives dimensions of this theatre. The seats (he says) are $1\frac{1}{2}$ feet high and $1\frac{1}{2}$ feet broad. There was a scene or structure in front, the foundations of which, of polygonal masonry, still remain.

The small theatre is at the south-east angle of the plateau, so close to the edge of the precipice that part of it has fallen down from the disruption of the rock by natural causes. What remains is sufficient to show that the interior diameter was about 60 feet, and the number of seats 22; the breadth of the *scene* being less than the interior diameter by two small square chambers, the foundations of which as well as those of the scene exist, all of squared masonry.

In the small ravine before mentioned, between the western wall and the mountain cliff, Colonel Leake found many tombs

"Of an ordinary character, 7 to 9 feet long, and 3 or 4 feet wide, either hewn out of the rock and covered with three massive pieces of stone, or, where the soil was earthy, had sides constructed of four fragments of stone set edgewise, with a covering of similar slabs. Having caused four of these tombs

to be opened, I [Colonel Leake] found in the first a great number of broken vases and bones, three or four small lachrymatories, as they are commonly called, and several long rectangular pieces of iron, 1-tenth of an inch thick and covered with gold-leaf. The second tomb, though it had no appearance of ever having been opened, produced nothing, not even bones; a part of its cover and all the body of the tomb were cut out of the rock. The third, which was also hewn out of the solid rock, produced fragments, but not many, of skulls and bones, with coarse vases of the usual forms, together with fragments of utensils made of lead, and a circular mirror of copper or mixed metal 6 inches diameter, placed within a cover of thinner metal, with a handle with an ornamented border. The same tomb contained a leaden box $2\frac{1}{2}$ inches high and $1\frac{1}{2}$ inches in diameter, shaped like the frustum of a cone, and having a button serving for a handle in the centre of the lid, but nothing remained in it but earth containing two or three minute snail-shells. In the fourth sepulchre were found two or three vases, and some more gold and iron ornaments. The mirror was placed vertically at the feet of the deceased: this and the small leaden box show that tomb to have been that of a female."

A wall of polygonal masonry extended across the ravine of the sepulchres, from near the Vasilospito to the cliff behind; and another wall down the hill, in a southerly direction, from near the same spot: these walls probably connected the Acropolis with some enclosed space below. Colonel Leake supposes that there was a large town on the plateau and slopes below the Acropolis, about the site of the present village of Camarina, which is half-a-mile south-west of it; this town he supposes to have been about 3 miles in circuit. He was supported in the idea by finding a piece of old wall below the present village: this piece of wall, however, appears to be of much more modern construction than the Acropolis. There is a good supply of water at the village, and appearances of natural or artificial reservoirs on the slopes near it.

Under the cliffs of the eastern and most lofty peak of the mountain is the monastery of Zalongo, about 500 yards east of the Acropolis. There is water at a sufficiently high level to have been conducted into the Acropolis. This peak of the mountain is bounded by cliffs; the top is a plateau, on the eastern end of which is a mound 100 feet high. In the centre of this plateau is the "metoki" of St. Michael, surrounded by small oaks. Colonel Leake found no Hellenic remains on this peak; it is possible, as it was beyond the range of ancient missiles from the Acropolis, that it did not form part of that fortification, although overlooking it; but the peak north-west of the Acropolis must have been included in it, as it completely commands it.

The eastern peak is celebrated in modern history for having been the scene of two of those chivalrous defences made by the Suliotes against Ali Pasha in the beginning of this century; at the first of which (so Colonel Leake was informed at the time) six men and 22 women threw themselves off the precipice on the

western side, in preference to falling alive into the hands of their enemies.

With respect to the history of this ancient fortress, Colonel Leake makes the following remarks :

" This great city I believe to have been Cassope, the city of the Cassopæi, who occupied the maritime country between Thesprotia and the Ambracian Gulf, and bordered on the territory of Nicopolis ; for although in the time of Scylax the Cassopæi dwelt *καμηδόν* or in small towns, it is very probable that the most advantageously situated of those towns became subsequently the head of the nation. The Acropolis therefore, of which the masonry indicates so remote an antiquity, may have been the *κάμνη*, older than the time of Scylax, and the lower city may have been added at that later period to which the coins of the Cassopæi have the appearance of belonging. That this people had a capital city is shown by Diodorus, who in relating an expedition of Lysiscus, commander of the forces of Cassander, against Alcetas King of Epirus, B.C. 312, states that Lysiscus, marching down from Acarnania into Epirus, pitched his camp near the city Cassopia. Agrapidhia was probably the *λίμνη* or harbour of the Cassopæi."

Mr. Hughes states that this city is referred by Meletius to " Elatria."

Both these travellers remark how little was known in their time of this ancient city ; and, as far as I am aware, very little additional information about it has been obtained since that date.* Some idea of the importance of it may be obtained from the fact that

* Supposing the ruins to be those of Cassopia, the real difficulty is to assign the period at which the city was built. This was certainly not after Greece came into the power of the Romans, for their policy universally was to create centres of commerce in such situations as should not have a military value, and to maintain camps of greater or less magnitude in commanding situations. Nicopolis constituted such a commercial centre. Possibly after it was built the old Cassopia was occupied as the *stativa castra* of one or more cohorts. Around these the sutlers lived, and thus the population increased to a considerable extent. The *Vasilospito* may possibly belong to these times, and be merely a store ; such exist in many of the African towns which were occupied by the Romans of the Empire. The objection to this theory to my mind is, that there do not appear to be any traces of an amphitheatre.

The expression of Scylax that the Cassopians lived *καμηδόν* must not be too hardly pressed. His description throughout is for the benefit of navigators ; and if the Cassopian produce was shipped at some place on the gulf, there would be no call for him to mention the city Cassopia, although the people might still regard it as the *caput gentis*. The city might, therefore, well exist in the early part of the 5th century B.C. The notice of Diodorus shows that it did in the latter part of the 4th century B.C.

As regards the architectural question of the arched chamber, there is nothing to prove (it would seem) that it is contemporaneous with the fortification of the Acropolis. I should not wonder if excavators were to discover many more such under ground.

I should think the Cassopians were *fishermen, coast navigators*, and (as all maritime Greeks were in the early times) *pirates*. They lay in the route of the traffic between the head of the Adriatic and Corinth. This was in its palmy state during the dynasty of the Orthagorids at Corinth. Periander held Coreyra, and probably the opposite shore, in a condition of a modified dependency. Perhaps Cassopia was built at the time when the dynasty was shaken, and Coreyra and other places became independent.—J. W. B.

the plateau of the Acropolis contains about 45 acres, and was as closely built on as Corfu, and that the present town of Corfu within the walls contains about 60 acres and 16,000 inhabitants. The larger theatre of Cassope would hold 3000 people.

VII.—The "*Kuweik River*," an *Aqueduct*. By D. J. MACGOWAN, Esq., M.D., U. S.

GEOGRAPHERS and cartographers, and even travellers and historians, have been puzzled in relation to the stream designated as the "*Kuweik* (Quoik, Kowick, Koeik) River," which, rising at the foot of Mount Taurus, and flowing nearly parallel with the Euphrates, loses itself in the marshes a little to the south of Aleppo, after a course of between 80 and 90 miles. It is said to have derived its name from the croaking of frogs, which abound on its banks. They are still found in vast abundance, are of a large size, and so delicious in quality that some European epicures, says Dr. Russell, have been heard to declare that it is almost worth while to make a journey into Syria to regale on them.

In the best maps of the upper part of the Euphrates several streams are represented as approaching that river from the west, having their origin west of the Kuweik. In some cases these tributaries of the Euphrates are represented as emptying into the Kuweik, while other more trustworthy topographers give dotted lines, indicating uncertainty, thus confessing the existence of a fluvial mystery which demands investigation. This investigation has been bestowed upon the subject by competent observers,—the Rev. J. C. Ford, a resident of several years at Aleppo, and Dr. Pratt, a resident of Aintab,—both gentlemen being American missionaries.

Mr. Ford, having often made ineffectual inquiries on the subject among the citizens of Aleppo, none of whom knew whence the water of their city came, nor how it was conveyed, being able only to say that it came from Aintab, a city about 60 miles north of Aleppo, determined to ascertain the state of the case by personal inspection. He has just favoured me with a communication giving the result of Dr. Pratt's and his own explorations to the north of Aintab.

"A ride of 5 miles from Aintab," writes Mr. Ford, "brought us to the course of the stream, where at a glance we saw the source of all the errors and confusion of the maps. We found in fact that it is not a *river* at all, but an *aqueduct*. The waters of a copious fountain, naturally streaming into the Sagûn, a branch of the Euphrates, are turned aside artificially and made to flow towards Aleppo. On following this aqueduct some miles to the south, we

discovered that it is carried on stone arches *over* the streams which rise westward of it and flow into the Euphrates." The same thing was subsequently remarked at other points by Mr. Ford as he was returning alone to Aleppo. He adds, "As this stream approaches Aleppo, it flows through a valley where no embankments or arches are needed to keep it in its course; and this accounts for the error of the natives and of travellers in supposing it to be a natural river."

Not only does this discovery of my friend enable us to correct our maps, but it throws, I think, some light upon an historical incident. I refer to the destruction of the Christian camp in the year 1123 by the sudden rise of the river Kuweik. It is recorded by Al Makin, and found in an unpublished transcript and translation of that author's history, by Gagnier, at Oxford (Hunt. MS., No. 16).

Al Makin says, "After the siege had continued eight days, and the place was upon the point of surrendering, the river Kuweik rose unexpectedly, and, overflowing its banks, carried away the tents, destroyed a great number of men, together with baggage and effects to an immense value. This disaster happened about three in the afternoon." In his '*Natural History of Aleppo*,' Dr. Russell remarks, "From the appearance of the Kuweik in summer, it cannot easily be conceived how a stream so inconsiderable should have proved so fatal to the Christian army encamped on its banks when the Franks in the time of the Holy Wars besieged the city." In his description of this stream, he says that in most summers the channel at Aleppo is almost quite dry. In some winters, when much snow has fallen to the northward, it swells to a formidable river, so as to cover the lower gardens and to overflow the bridges. With these facts before him, Dr. Russell cannot conceive how the disaster to the Christian army described by Al Makin could have occurred. It has seemed equally inexplicable to others. Now, however, that we know the Kuweik is an aqueduct, the difficulty vanishes. It appears to have presented in former times more of an artificial character than at present. Referring to its appearance where it flows by the celebrated gardens, Dr. Russell says that "Near the kiosks and bridges, where it was banked with stone, it has the appearance of an artificial canal; and in a few places where moles have been raised for mills or water-engines, it forms cascades." It is highly probable, therefore, that above seven centuries ago those "moles" and "stone-backings" and "canal-like" structures characterised the whole work in front of Aleppo; and nothing was easier, therefore, than for the beleaguered to open a sluice suddenly upon the besiegers, and scatter them by a flood. It will be noted that Al Makin describes the rising and overflowing as "sudden." The

conclusion, therefore, seems inevitable, that while the Kuweik "river" could not have produced so much devastation in an instant, the Kuweik aqueduct could and did accomplish, through the besieged in Aleppo, the phenomenon in question.

The aqueduct by which the city is mainly supplied with water, conveyed from springs about eight miles to the north of the city, is supposed by Arab writers to be coeval with the city, but is said to have been repaired by the Empress Helena, mother of Constantine; but when or by whom this aqueduct, of more than 60 miles in length, was constructed is disclosed neither by history nor by tradition. In point of magnitude and utility, it may be favourably compared to those remarkable works in Lower Mesopotamia or Babylonia by which the Euphrates and Tigris were connected, where canals for irrigation and navigation intersected the country in every direction.

VIII.—*Notes on an Excursion to Harrān, in Padan-Aram, and thence over Mount Gilead and the Jordan, to Shechem.* By CHARLES T. BEKE, Esq., PH.D., F.S.A., F.R.G.S., &c., (Gold Medallist R.G.S.)

Read, June 16, 1862.

THE excursion into Syria, from which I have recently returned, was undertaken for the purpose of verifying the position of Harran (Haran, or Charran), in Padan-Aram, mentioned in the Book of Genesis and in the Acts of the Apostles. This place has generally been supposed to be represented by Harrān, a well-known town on the river Bilik, in Mesopotamia, beyond the Euphrates;* but many years ago I saw reason to doubt this identification, and in my 'Origines Biblicæ,' published in the year 1834, I expressed the opinion that "the country watered by the Pharpar and Abana—the fertile district known in aftertimes as the *Ager Damascenus*—is Padan-Aram, the country into which, by the Divine direction, Terah and his family removed, and in which was situate the city of Haran, or Charran, whence Abraham was called, and which afterwards was the residence of Laban"† (p. 131). At the time when

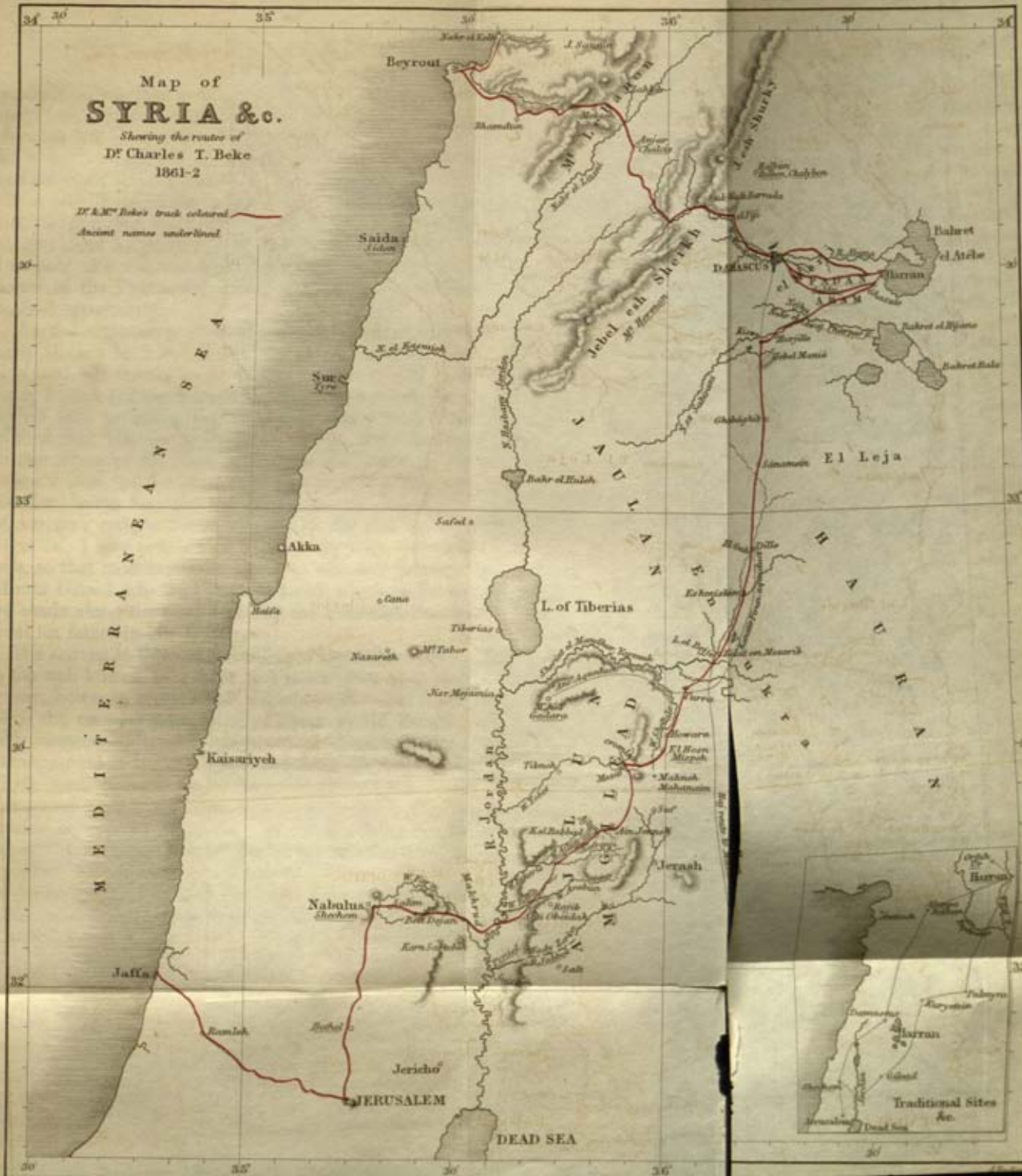
* See Dr. William Smith's 'Dictionary of the Bible,' p. 755, Art. HARAN.

† From the omission of Nahor's name among those of Terah's family (Gen. xi. 31), who removed from *Ur-Casdim* (Ur of the Chaldees) to Harran, it may be inferred, though it is nowhere mentioned, that Nahor did not accompany his father. But as in Gen. xxv. 20, Nahor's son Bethuel, the father of Laban and Rebekah, is described as being "of Padan-Aram," it is evident, though this, too, is not explicitly stated, that he must have followed Terah into that country; if, indeed, it is not to be inferred from Gen. xxiv. 10 that Nahor himself removed from *Ur-Casdim* into *Aram-Naharaim*. Whatever uncertainty may be considered to exist on this historical question,—which for all purposes of the Scripture narrative is, however, of

Map of SYRIA &c.

Showing the routes of
Dr Charles T. Beke
1861-2

Dr & Mr Beke's track coloured
Ancient names underlined



this opinion was placed on record, and for many years subsequently, there was no knowledge of the existence at the present day of any place named Harran, in the locality which I attributed to it. As far as I am aware, the first person to whom Harran became known was the Rev. J. L. Porter, who, in his 'Five Years in Damascus,' vol. i. p. 376, describes a visit made by him in November, 1852, to a village called *Harrān-el-Awamid*, or "Harran of the Columns," situate about 14 miles almost due east of Damascus. This village I at once saw was the long-looked-for representative of the residence of the Patriarchs, and I determined on visiting it at the earliest opportunity.

As the arguments for and against my identification of Harran have already been laid before the public on more than one occasion, and will shortly be so again in a fuller and more connected form, I shall refrain from discussing the question here, contenting myself with asserting my conviction that I have sufficiently established that Harran in Padan-Aram, or *Aram-Naharaim* (that is to say *Aram* of the Two Rivers), is the place of that name between Abana and Pharpar, the two rivers of *Aram*, or Syria,—and not the Harran between the Euphrates and Tigris, the two rivers of Assyria; and, on the assumption of the correctness of this identification, I now proceed to narrate my visit, accompanied by my wife, to that most interesting spot, as also our journey thence over Mount Gilead into the Promised Land, which, as far as practicable, we made along the road taken by the Patriarch Jacob in his flight from his father-in-law Laban.

We arrived at Beyrout on the 5th of December, 1861. This place is too well known to render any description of it necessary here. I may, however, remark that of late years—and more particularly since the military occupation of Syria by the French—very great improvements have taken place in and about the town; and that a carriage-road is being constructed from Beyrout to Damascus, of which one-half, as far as Zahleh, was opened last summer, and the remaining half is intended to be completed in the course of the present year. There is also a line of electric telegraph in successful operation between Damascus and Beyrout.

Before commencing our journey to Damascus and Harran, we made an excursion to Nahr-el-Kelb, for the purpose of inspecting that celebrated locality, and especially in order to examine the inscription recently placed by the French on one of the ancient Egyptian tablets existing there.

When in Paris, on my way to Syria, I had been assured of the

a secondary character,—it applies not less to the traditional Harran beyond Euphrates than to my Harran near Damascus; and therefore it does not in the slightest degree affect the geographical question as to which of the two was the residence of Laban.—October 3, 1862.

absolute incorrectness of a statement in the public prints that the Egyptian tablet in question had been refaced, and an inscription cut on it commemorative of the presence of the French army in Syria in the years 1860 and 1861. We found, however, that the fact was as had been stated.

The condition of this tablet (known to travellers as "No. 1, Egyptian") before the French inscription was engraved on it is fully discussed by Dr. Edward Robinson, in his '*Biblical Researches*' (Second Edition, vol. iii. pp. 619-623). The conclusion which that intelligent investigator arrived at is, that when he saw it in June, 1852, no ancient figures remained on the tablet;* but, from its appearance, he says "the suggestion arose in our minds while on the spot, as it had done to others before us, whether the Assyrian conquerors, in their 'pride of power,' may not have purposely defaced the Egyptian monuments erected six centuries before, and then boastfully have caused their own to be sculptured side by side with them."

The pass round the end of the precipitous ridge of rocks which forms the southern bank of the ancient Lycus must always have been a terror to invading armies; and the surmounting of it may fairly have been deemed an exploit worthy of commemoration by each successive conqueror. That, in this character, a Sennacherib should have mutilated the monument of an earlier Sesostris, might be regarded as not unnatural, and therefore venial; but that, at the present day, the temporary occupiers of Syria—not in their own name only, but as the representatives of the other great Powers of Europe, and as the friends of the Government of the country—should have thus appropriated to themselves this venerable relic of past ages, would hardly be credited, were it not an ascertained fact. My wife took a photograph of the ancient Egyptian tablet, with its modern French inscription; which, though the plate was unfortunately injured by water in our passage of the Jordan, affords still a sufficient representation of the monument in its actual state.

We left Beyrout for Damascus on the 14th December, going by the direct road through Bhamdūn, Mekseh, Fijī, and Sūk-Wadi-Barada, and leaving it only to visit the ruins of Anjar, which has been identified by Dr. Robinson with the ancient Chalcis under Lebanon. The ruins of this city are now rapidly disappearing, the broken shafts of columns, hewn stones, and other architectural fragments being either worked up for the masonry of the bridges of the new carriage-road, or else burnt into lime.

* See, however, "*Notice of some curious Remains of Antiquity in the Vicinity of Beyrout, with plates*, by JOSEPH BONOMI, Esq.," in '*Transactions of the Royal Society of Literature*,' vol. iii. pp. 105-107; where a representation of the tablet is given, as drawn by that gentleman in January, 1834.

From the advanced period of the year at which we visited Syria, snow had already fallen deeply on Lebanon, and we were fearful our passage by the direct road would be impeded. We were fortunate in passing as we did. Our dragoman, who had to return to Beyrout to fetch tents and other requisites for our further journey across the plains of Hauran (which we had not deemed it expedient to bring in the first instance, lest we should find the journey impracticable), did not meet with equal good fortune, but was forced to take the circuitous route by Rasheiya and Hasbeiya.

The carriage-road, as finished over the ridge of Lebanon, much resembles those across the Alps in their easier portions, there being here no necessity for great engineering works. There are, however, several well-built bridges, and, as far as completed, the work does credit to its undertakers. Just as we were passing the *col* we came up with several droves of mules, asses, and camels, laden with British manufactured goods, iron rods, and *Persian tobacco*; and we met others coming down from Damascus and Zahleh, carrying grapes, dried apricots, and other articles of native produce; as also large flocks of goats, which were being driven down to the sea-coast for pasturage,—the whole in a state of almost inextricable confusion.

That tobacco from Persia should be carried to Damascus from the west, instead of the east, was unintelligible to me till I obtained the following explanation. The caravans between Baghdad and Damascus, of which there used to be three or four annually, have for the last three years or more been discontinued, in consequence of a very rich one having been attacked and plundered by the Beduins, by which the Damascus merchants are said to have lost upwards of 40,000*l.* sterling. The direct communication between Baghdad and Damascus being thus suspended, goods for the Damascus market have to be brought round by the way of Mosul and Aleppo to Scanderoon, where they are shipped to Beyrout, and thence brought up this way. When at Damascus I heard that it was shortly intended to reopen the direct route from Baghdad; and from an article in the '*Times*' of the 21st of April (1862), it appears that the attempt has been made, but that unfortunately the caravan has been again attacked and pillaged near Palmyra. This must unavoidably, and perhaps indefinitely, postpone the resuscitation of the direct trade with Baghdad, from which the inhabitants of Damascus might have hoped to derive some compensation for the great losses they have of late sustained. In the present unsettled state of political affairs in Syria it would, however, be useless to look for any certain amelioration of the material welfare of Damascus. The Christians, who were the principal merchants, appear to have abandoned the city; and until a firm, powerful, and energetic government can guarantee the safety

of their persons and their property, they will hardly think of returning. But this is a subject which has been so repeatedly and fully discussed of late, that it would be out of place to dwell on it here.

We arrived at Damascus in the afternoon of the 17th of December, and I lost no time in presenting my letters of introduction to the worthy representative of our nation—Mr. E. T. Rogers, Her Majesty's Consul—to whom I will here at once express our hearty thanks for his great kindness and attention to us personally, not less than in furthering the object of our journey. Our dragoman having left Damascus for Beyrout, Mr. Rogers kindly placed at our service one of his kawasses to accompany us to Harran, for which place we started on the morning of the 20th of December. From the short time Mr. Rogers had been at Damascus, he was unable to state what might be the condition of the district we were about to visit; and he therefore recommended that, instead of going direct to Harran, we should first proceed to Sekka, a village about 9 miles from Damascus, belonging to Dr. Wetzstein, for many years Prussian Consul at Damascus (but now Professor of Arabic in the University of Halle), who then happened to be there, and from whom we might obtain every requisite information and assistance.

Our road to Sekka lay in an E.S.E. direction through the fertile plain of Damascus, bounded on either side by the rivers Barada and Awaj, the representatives of the "Abana and Pharpar, rivers of Damascus," of the Second Book of Kings. For some distance we passed through orchards and plantations, and then over wide-spreading downs, interspersed with cultivated tracts adjoining the numerous villages. On reaching Sekka about mid-day, we found Dr. Wetzstein just about to sit down to a dinner given him by his villagers previously to his return to Damascus that evening. We were, of course, invited to partake of the feast; after which Dr. Wetzstein, with Oriental even more than European courtesy, insisted on escorting us to Harran in person, though all his arrangements had been made for returning that evening to the city. The distance from Sekka to Harran is about 5 miles in an E.N.E. direction; but, owing to the watercourses and ditches being filled by the rains, we had to make a considerable *détour*, so that we did not reach our destination till near sunset.

As the object of our journey was to visit the place where the Patriarch Jacob had for twenty years kept the flocks of his father-in-law Laban, we could not but be struck by the sight of some large flocks of sheep, with their lambs only a few days old,—they having this year been dropped somewhat earlier than usual; and the white ewes giving suck to black, "ring-straked, speckled, and grisled" lambs, forcibly reminded us of the incidents nar-

rated in the 30th and 31st chapters of Genesis. Our approach to the village recalled to our remembrance even more strongly the narrative, in the 24th chapter of the same Book, of the arrival at Harran of Abraham's eldest servant, when sent to seek a wife for his master's son Isaac. Like him we arrived "at the time of the evening, even the time that women go out to draw water;" and as we came "without the city," we met "the daughters of the men of the city," with their pitchers, going out for water. As Abraham's servant must have approached from Damascus, which lies west of Harran, he would have met the women as they went out to draw water. We, entering from the south, crossed their line of march. But, without following them, we at once entered into the village, to make arrangements for passing the night there. Dr. Wetzstein remained with us till early next morning, when he departed for Damascus, leaving us to pursue our investigations alone.

Instead of continuing my narrative journal-wise, it will be better that I should give in a condensed form the general results of our observations and researches, both on the present occasion and on a second visit which we made to Harran on the 30th of December.

Harran—generally known as *Harrân-el-Awamid*, or "Harran of the Columns," from three Ionic columns standing amidst the mud-houses of which it consists at the present day—is a village situate at the eastern extremity of the plain of Damascus, near the southern portion of the Bahret-el-Atêbe, which receives the waters of the Barada, as the Bahret-el-Hijâne is the recipient of those of the Awaj. In the best-known maps the waters of the Barada are shown as flowing into two lakes, named Bahret-esh-Sharkiyeh and Bahret-el-Kibliyeh; but in Dr. Wetzstein's map these two are but portions of a single lake, to which he gives the name of Bahret-el-Atêbe, as we ourselves heard it called at Harran. Had we been able to visit the lake, we should no doubt have found it at this season of the year covering a greater extent of ground than is even shown in Dr. Wetzstein's map. In the dry season the northern and southern portions most probably form (as it were) two lakes, united only by a narrow line of water, or perhaps of marsh only.

The rains had rendered the village itself such a mass of mud and filth, that it was difficult for us to make any explorations of a very satisfactory nature, or, indeed, to move about at all without great difficulty. At the present day Harran consists of about 150 or 200 houses, built of stones covered with mud; but, from the architectural remains found scattered throughout its streets and in the enclosures of the houses, and more especially from the three columns from which the place derives its modern appellation, it manifestly occupies the site of some ancient Greek or Roman city.

The place appears to be in a thriving condition, its inhabitants,

like the Patriarchs of old, possessing large flocks and herds; and round the village are extensive vineyards, the vines being planted in regular order at some distance one from another, like the cherry and other fruit-trees in our Kentish orchards.

On the sides of Lebanon the vines are nearly as large, only there they are allowed to trail over the ground; whereas here each is pruned into a tree or bush, standing quite erect, without any prop, trellis, or other support. At the season of the year when we saw them they were not in leaf, and they presented the appearance of gigantic gooseberry-bushes. When in full bearing they must look magnificent: we were told that sticks have then to be placed under the loaded branches, to prevent the grapes from touching the ground.

The neighbourhood of Damascus has always been celebrated for its grapes. Those of Halbūn, a village about as far to the northward of the city as Harran is to the east, are, as Dr. E. Robinson tells us,* "greatly esteemed for their rich flavour, and from them is made the best and most-highly-prized wine of the country." We can ourselves bear testimony to this, from having drunk of the wine in the house of our friend Dr. Wetzstein, who had made it from grapes sent to him by the villagers of Halbūn. The Prophet Ezekiel (xxvii. 18), when enumerating the articles in which Damascus traded with Tyre, particularises "*the wine of Helbon and white wool*;" and the geographer Strabo (B. xv. c. iii. § 22) speaks of the wines of *Chalybon* as being among the luxuries of the kings of Persia. The city of *Haleb*, or Aleppo, in Northern Syria, was, until recently, supposed to be the Helbon of Scripture and the Chalybon of profane history; it was, however, only requisite for modern investigators to point to Halbūn, near Damascus, as the true Helbon, and the correctness of the identification was at once admitted.† My identification of the Biblical *Harran* near Damascus, is based on almost more conclusive evidence than that of Helbon. The distance between the two Harrans is also not much greater than between the two Helbons, the former being less than 240 geographical miles in a direct line, while the latter is upwards of 150 miles. Yet, strange to say, the strongest advocates of the rectification of the position of Helbon are the most decided opponents of my identification of Harran.

As may readily be imagined, the first object of our inquiry was a

* 'Biblical Researches,' vol. iii. p. 471.

† Dr. E. Robinson says (*op. cit.* iii. 472), "The missionaries are probably right in regarding this place as the *Helbon* of Scripture." On this Dr. Wetzstein remarks ('*Zeitschr. d. Deutschen Morgenl. Gesellsch.*,' xi. 490), "He should rather have said, 'The Rabbis rightly regard this place,' &c.; for it is by them that the attention of us Europeans has been directed to this, as well as many other important points of Biblical archaeology." See also Dr. H. Petermann's '*Reisen im Orient*,' vol. i. p. 310.

well on the *western* side of the town, which should represent "the well of water without the city," at which Abraham's servant—Eliezer of Damascus, as is generally supposed—met the damsel Rebekah. We were at first told there was no well in or near the place; and when we asked where, then, the women were going, whom we had met on our arrival in the evening with their pitchers on their heads or shoulders, we were answered that they were fetching water from a canal running at a short distance to the south-west of the village. However, on inquiring and examining further, we discovered not only one well, but two wells; and I am not prepared to say there may not be others. The chief one of the two wells which we saw is within a covered building standing in the courtyard of the mosque, which is situate at the western end of the village, towards Damascus, and near the public cemetery. Were it not for the inclosure of the yard, the well would be altogether outside the town, as is, in fact, the second well, which is at a short distance to the south-west of the other, and close to the cemetery. The building within the courtyard containing the first well, is constructed of stones, apparently obtained from more ancient edifices, covered over with a cement of lime and mud. It is square in shape, and has a window and two doors, with a wooden ridge-roof, the floor being paved with stones. The well is in the north-east corner; its mouth, which is built of roughly-hewn stones, is about 2 feet 6 inches in height, and 3 feet in width, its orifice being circular, and about 1 foot 6 inches in diameter. Above the orifice, and fastened to each side, is an iron bar, bent double in the middle, from which, by a pulley and an endless rope, is suspended a leather bucket, by means of which the women fill their pitchers. The water stands in the well about 10 feet from its mouth. From the extremely smooth and polished surface of the stones inside, this well must have been in use very long indeed. Near it, within the building, stand two stone troughs, about 1 foot 9 inches in width, and respectively 4 feet and 3 feet in length, evidently of great antiquity, of which the use must (I think) have been to water cattle. But since the well has been inclosed and covered in, they can, of course, no longer serve that purpose. I could not learn that any tradition or history whatever is attached either to the well or to the troughs. Without intending to assert that this is actually the "well of water" at which took place the meeting between Eliezer and Rebekah, I may point to its entire correspondence with all the requirements of the narrative in the 24th chapter of Genesis as being very remarkable.

The second draw-well outside the mosque-yard, already alluded to, is of a similar character to the one within the yard, but rather smaller; its mouth is covered with a stone, and it is no longer used, the water being said to be bad. But that of the first well—

"Rebekah's Well"—appeared sweet and good to the taste, though evidently containing much saline matter in solution;* and on both our visits we saw many females come there for water with their pitchers and pans. Being, however, within the mosque-yard, it could not serve for the general requirements of the inhabitants; and, accordingly, water has to be fetched from a small and shallow artificial canal from the Barada, which, if not altogether of modern formation, has recently been reopened, the earth thrown up along its banks having been but a short time dug out of its bed.

The mosque itself is a comparatively modern building, constructed of columns and other remains of former edifices, plastered and painted over. It has a square minaret, with a circular turret in the centre, possessing a general resemblance to an English village steeple.

Not far from the wall of the courtyard of the mosque, and at the eastern end of the cemetery, is a building, now in ruins, apparently the tomb of a *wely* or saint, constructed of ancient cut stones, put together without mortar. Several of these are beautifully carved: some figures of eagles are full of life, and some scrolls artistically executed.

The three Ionic columns, from which Harran has acquired its distinguishing appellation, are situate in nearly the centre of the town. Two of them are complete, with their capitals; the third has lost the upper portion. The height of each shaft is 29 feet, and that of the base 2 feet 3 inches. The circumference of the shaft is about 11 feet 7 inches: it is not in one piece, but formed of blocks 8 and 10 feet in length. The interval between the two columns facing the east is 6 feet 9 inches; whilst that between those towards the north is as much as 7 feet 9 inches. We were told

* Sir Roderick I. Murchison had the kindness to direct an analysis of this water to be made at the Royal School of Mines, of which he is Director. The results were as follows:—

"The water from 'Rebekah's Well' contains 109·76 grs. of solid matter in one gallon. This consists of potash, soda, lime, magnesia, sulphuric acid, and chlorine, with a little organic matter. The amount of lime in solution in the imperial gallon is 6·08 grs.; of magnesia, 17·30 grs.: so that the greater proportion of solid matter must consist of alkaline salts. The residue at the bottom of the bottle contained carbonates of lime and magnesia, with some earthy matter—probably clay. This deposit of carbonate of lime and magnesia results from the fact that the water has lost some carbonic acid since it was taken from the well; so that the actual amount of lime in solution in the water, when taken from the well, would exceed 6·08 grs. in the imperial gallon: the same remark applies equally to the amount of magnesia. The amount of water at disposal did not allow of a more complete analysis.

"Laboratory, Museum, June 16, 1862."

"CHAS. TOOKEY.

It should be explained that the water submitted to analysis was only a small portion of a quantity of several gallons, which was decanted off from the residue, after having stood several days at Damascus in a vessel imperfectly closed.—B.

there was formerly a fourth column, forming a square; but, from the difference between the intervals, this would seem not to have been the case, and I should rather regard them as portions of two separate rows of columns.

The mud buildings, above which tower these beautiful remains of a former age, prevent all means of satisfactory examination; but, as far as we could ascertain, the bases of these columns rest on a massive stone wall, about 9 feet in height from the ground.

The stone of which these columns are formed is a highly crystalline, though partially vesicular, trachytic basalt. In its exfoliation from the gradual operation of time and weather, acting probably on a concealed spheroidal concretionary structure, may be plainly seen how ortholiths, whether composed of one or more than one piece, may be overthrown, without the intervention of the devastating hand of man or any great convulsion of Nature, to one of which causes the destruction of ancient erections is generally attributed. The layers of the stone separate themselves from the mass at its lower end,—not in a rectilinear, but in a curvilinear form,—by which the mass itself gradually lessens in size below. This process continues till, the centre of gravity being transferred outwards, the ortholith falls from its own weight, just as a tree when felled. It is sad to see the columns at Harran rapidly undergoing this silent operation of Nature.

That Harran is the representative of the place of that name mentioned in the Book of Genesis as the residence of Terah and his descendants, there is now no reasonable ground for questioning. What may have been its designation in intervening ages, is for the present a mystery.* Further research will doubtless bring this to light; and a clue to it may, perhaps, be furnished by an inscription on a broken piece of the shaft of a small column which I discovered, but could not bring away with me. Dr. Stanley's attention has been directed to this inscription, in case he should be able to visit Harran when at Damascus with the Prince of Wales; otherwise I have taken steps to have it brought to England.† This fragment is, however, so much covered up, and the small part exposed is so weather-worn, that I was unable to decipher any portion of the inscription, which I believe to be in the *Greek* character, but dare not speak positively on the subject.

* The Arabian geographer Yakūt, in his '*Mushtarik*' (edit. Wüstenfeld, Götting., 1846, p. 125), says, "Harrān is one of the towns of the Ghutah of Damascus." It was, therefore, known by its present name in the 12th century of the Christian era.—October 20, 1862.

† Dr. Stanley was unable to visit Harran; but he commissioned the Rev. Smylie Robson, an American Presbyterian missionary at Damascus, to examine, and, if possible, bring away the piece of column with its inscription. Mr. Robson's visit to Harran is described in a letter dated Damascus, July 15, 1862, which is intended to be inserted in an appendix to Dr. Stanley's forthcoming work, entitled '*Lectures on the History of the Jewish Church*.'—October 20, 1862.

We had intended to remain longer at Harran, for the purpose of taking photographs and drawings; but the weather was so very unfavourable, and the prospect of its improving so remote, that we decided on not delaying our journey to Mount Gilead, lest anything should occur to frustrate it altogether. On our arrival at Damascus we had arranged with the dragoman who had come with us from Beyrout that he should go with us on our further journey. Under his agreement he had accompanied us on our second visit to Harran; and as on leaving Damascus we had taken leave of our good friends Mr. Consul Rogers and Dr. Wetzstein,—the former of whom had furnished us with letters of recommendation to all the chief personages on our line of road,—we had no occasion to return thither; therefore on the 1st of January of the present year (1862) we started on our journey. The part of it which most threatened to be dangerous was the district lying immediately to the south of the river Awaj. It is occupied by the Arab tribe of Sūlt (plural Salūt), one division of whom are in deadly feud with the Turkish Government, who have put a price on the heads of their chiefs. Whilst we were at Damascus two heads were brought in, and, after being presented to the Mushir Pasha, they were exposed for three days on a black board in the Arab bazaar. On their being thrown down before the Seraskier, he rose from his divan, stamped on the heads, spat on them, and kicked them about, cursing them all the while in the choicest Turkish.

We were in some perplexity as to the best means of passing in safety through this debateable land. At length it was decided that the Consul should apply to Emin Pasha, Wali or Governor of Damascus, for an order to the Commandant at Kiswe to furnish us with an escort as far as Eshmiskin, the residence of Sheikh Ahmed-et-Türk, which he obtained for us just before our departure for Harran. In the plain of Damascus we were, so to say, at home. From Harran, then, we proceeded to Ghazūle, another of Dr. Wetzstein's villages, the sheikh of which, named Mahmūd, whom we had met at Sekka, accompanied us to Nejha, on the Awaj, and the sheikh of this latter village furnished us with a guide to Kiswe. From Nejha our road lay along the northern side of the Awaj, till we came to Hurjille, where we crossed the river over a stone bridge, and proceeded up its right bank to Kiswe.

The Awaj is the Pharpar of Scripture,—the "river" that was crossed by the Patriarch Jacob, when he fled from Laban, as narrated in the 31st chapter of Genesis: "And he rose up, and passed over the river, and set his face toward the Mount Gilead." The precise point at which he so crossed the Awaj may be difficult to determine; but, on account of the mountainous district to the south of the river, known as Jebel Māni'a, it is manifest that he must either have gone round to the east of it from Nejha, or else

have continued westward up the river (as we did) in the direction of Kiswe. I am of opinion that he adopted the latter course.*

Kiswe is a large village situate on an eminence commanding the *Haj* road from Esh-Shām, and possessing a strong garrison. We found that the commanding officer, Ahmed Agha, to whom our *balordi* from Emin Pasha was addressed, had gone south with a body of soldiers; but his lieutenant readily gave us a dozen *bashi-buyurūldi* to escort us to Ghabāghib, where he said we should meet with Ahmed Agha. With this escort we left Kiswe on the morning of the 2nd January, proceeding southward along the high road leading to Mecca.

This road has in past times received much attention from the rulers of the country, the streams being bridged over, and a causeway laid in many parts; but the whole is now in so dilapidated a condition, that it is often preferable to travel by the side of the road instead of upon it; while many of the arches of the bridges are broken through, so as to render the passage of them at times not without danger. The country here is apparently of good soil, but thickly strewn with stones of all sizes, by which its cultivation is rendered difficult. In the dry season, too, it suffers from want of water. Besides this, not a tree or a shrub is to be seen; so that altogether it has a most desolate appearance. As we travelled very slowly, it was four hours after leaving Kiswe before we reached Ghabāghib, a small village built of the black basaltic stone of Hauran, where we learnt that Ahmed Agha had gone on to Sānamein. Our escort wanted to stop here for the night, but we insisted on going on, when they said that their orders were to accompany us only as far as Ghabāghib. As we did not think we were now likely to fall in with any of the Salūt Arabs, my wife and I determined on proceeding alone, and started accordingly. Our servants were at first inclined to remain behind with the escort; but before we had got far from the place, they came creeping after us, and we reached Sānamein in safety in about three hours. The approach to this place is very striking. Two lofty square towers are visible from a considerable distance, bearing in our eyes a general resemblance to Rochester Castle and Cathedral. The whole town is full of the ruins of buildings, showing it to have been once a place of importance; but the houses, as at present existing, appear to have been more than once destroyed, and rebuilt with the ruins of former buildings.

On our arrival at Sānamein we found that Ahmed Agha had again flitted. He was said to be scouring the country, being one

* A consideration of the circumstances connected with the preparations for Jacob's departure from Padan-Aram, as related in Gen. xxx. 25-43, xxxi. 1-21, corroborates this inference.

night at one place, and the next at another. This occasioned us no little difficulty with our dragoman and his people, who refused to go on without protection. It was no easy task to make them understand that we ourselves were no more desirous than they were to run into needless danger. The sheikh of Sānamein having assured them and us that we were quite safe in his hands, it was finally arranged that we should proceed to Eshmiskin under the charge of his son.

The next morning (January 3rd) we left Sānamein with our single unarmed guide, and soon fell in with a party of villagers with their laden mules going our way; and, our attendants having joined company with them, they all went on together through a well-cultivated country, talking and laughing, with no more fear than in the plain of Damascus. At Sānamein we had quitted the basin of the Awaj, and entered that of the Jordan, a small stream near this town being a tributary of the Yarmūk; and the character of the country now went on improving the farther we proceeded.

We left Sānamein at a quarter-past nine, and arrived at Eshmiskin at half-past three; our rate of travelling being very slow, owing to the heavy state of the roads.

Eshmiskin or Shekhmiskin is the residence of Sheikh Ahmed-el-Harîri, better known as Ahmed et-Türk,—*Sheikh Mushaiikh Hauran*,—that is to say, Sheikh of the Sheikhs of Hauran, he and his whole tribe being *Sherrifs* or descendants of the Prophet.

In Murray's 'Handbook for Syria and Palestine,' p. 532, it is said that Eshmiskin is "occupied exclusively by Muslems, famous, like all their brethren along the *Haj* road, for fanaticism. Fortunate will the traveller be, or at least well-protected, who escapes insolence and insult at their hands." In justice to Ahmed et-Türk and his people, I am bound to place on record the fact that, when the news arrived in Hauran of the massacre of the Christians in Damascus in 1860, great disturbances took place in this district, and the lives and property of its Christian inhabitants were placed in jeopardy. This was particularly the case at Edhr'a, where there are as many as 500 or 600 Christians, the inhabitants of two villages in Jebel Hauran having removed thither to avoid the persecutions of the Druzes. Ahmed et-Türk, on learning this, instantly sent letters to all his kinsmen, and collected 200 armed men, at whose head he hastened to Edhr'a just in time to save the Christians from the Arabs of the Leja, whom he drove off. He then wrote to all the chiefs of tribes in the Leja, desiring them to spare the Christians among them for his sake, which they did accordingly. Several other instances of his interference to protect the Christians were mentioned. And it was not only here at Eshmiskin that we heard all this. Before our departure from Damascus we had been told of Ahmed et-Türk's noble and

disinterested conduct, the very reverse of "fanaticism," and hence we were induced to make inquiries on the spot.

On the following morning we left Eshmiskin, accompanied by the sheikh's brother, Sheikh Mahmūd, passing through a rich country, the inhabitants of which were actively engaged in ploughing and sowing. In one field alone we counted 12 ploughs. In about four hours we reached Kelāt-em-Mezarib, an important *Haj* station, the castle being built close to a small lake, called El-Bejje, which contains water all the year round. Our road lay directly towards Jebel Ajlūn, the Mount Gilead of Genesis; the marked separation of which from the country we were traversing shall be described in the words of Dr. Edward Robinson, rather than my own, lest I should be suspected of being biassed by my pre-conceived ideas of what "Mount Gilead" ought to be, a suspicion from which the evidence of an indifferent observer must necessarily be free. In speaking of Jebel Ajlūn, Dr. Robinson says:—"This province embraces so much of the mountainous country east of the Jordan as lies between the Yarmūk and the Zārka. *At the northern extremity it suddenly declines to the level of Jaulān, which appears at a distance as a continuation of the Nukrah of Hauran; and presents on the east side of the Lake of Tiberias the edge of a high plateau, intersected by deep ravines. No mountain crosses it [Jaulan], to connect Jebel Ajlūn with Jebel-esh-Sheikh [Hermon].*" Thus Jebel Ajlūn, or Mount Gilead, stands out distinctly and prominently before every traveller crossing the plains from the north and east, to whom it serves as a landmark and a guide. We could not lose sight of it from the absence of all intervening objects; and we could thus thoroughly appreciate the few emphatic words in which the Patriarch Jacob's flight from Padan-Aram is described:—"He passed over the river, and set his face toward the Mount Gilead;" precisely as we were now doing when following in his footsteps. In a couple of hours more we arrived at Turra, a small village, of which the houses are all under ground. As it was raining hard, we did not stop, but pushed on to Howāra; which place we were given to understand was about an hour farther on, but which it took us nearly four hours to reach, for we did not arrive till half-past seven o'clock. Our road for the greater part of the distance lay along the valley, and at times up the bed of the Wady Shellāle, a tributary of the Yarmūk. The moon, though young and mostly obscured by clouds, was sufficient to enable us to find our way, yet not without difficulty. It was fortunate, however, that the evening was not brighter; for in the valley we passed near to an encampment of the Beni-Sakhr Arabs, and saw the fires of another on the mountains above us. Had they perceived us, we might not have passed unquestioned. It is true we had letters from the consul to the sheikhs of three separate

divisions of this powerful tribe, but we were better pleased at not having occasion to produce them.

On the other hand, we had the misfortune to miss seeing the remains of an ancient aqueduct, known as the Kanātir Fir'on, which served to convey the water from a lake or marsh called El Gāb, near Dilli on the Haj route north of Eshmiskin, to the city of Gadara or M'kes, and which crosses Wady Shellāle on three tiers of arches. Notwithstanding that its local name, "Pharaoh's Bridges," might be considered as pointing to an indefinite antiquity, Dr. Wetzstein has shown in his '*Reiseberichte über Hauran*,' that this aqueduct is the work of King Gebele I., a monarch of the *Christian* dynasty of the Gassanides, to whom many of the erections in these regions owe their origin.

Howāra is a miserable village, its houses being mostly under ground, and, as there was a total want of accommodation for us, we were glad to pitch our tents outside the place.

Leaving Howāra next morning (January 5th), we in less than an hour reached the village of El-Hosn, conspicuously placed on the summit of a *tell*, or conical hill. Its inhabitants are principally Christians of the Greek Church. We observed here, as in many other places, immense holes or caverns under ground, used as dwelling houses and granaries. The mouth is small, but below they are of great extent. We did not stop to examine them. We were here ascending Jebel Ajlūn, which may be regarded as commencing from Wady Shellāle, most of the sources of which are in its sides. We found, indeed, the whole of the ground as we ascended full of springs. In little more than half an hour after leaving El-Hosn, we came to a beautiful rivulet, being the first *clear* water we had seen since we left Damascus, at which with one accord we stopped to drink: in fact, we all made a rush at it, our animals not less eagerly than our attendants and ourselves. A few minutes more brought us to the summit of Gilead, where our eyes were gladdened with the sight of what is probably the most interesting portion of the Promised Land. The conspicuous cone of Mount Tabor was at once identified; and then Nazareth, Cana, Tiberias, and the principal places of our Saviour's miracles and teaching were pointed out to us. As our road from Harran hither closely corresponded with that taken by the Patriarch Jacob on his return into the Land of Canaan, it is manifest that his resting-place on the summit of Gilead, where he "pitched his tent in the mount," and where he was overtaken by Laban on the seventh day of his flight, must have been somewhere in this neighbourhood, possessing the advantages of a plentiful supply of water and good pasturage for his numerous flocks and herds;—such, in fact, as are found at the place where we stopped to drink. And as, further, it is written that "early in the morning Laban rose up, and . . . departed,

and returned unto his place; and Jacob went on his way, and the angels of God met him . . . and he called the name of that place Mahanaim,"* it may not unreasonably be imagined that here, on the brow of the mountain overlooking the scene already described, was the place of the Patriarch's mysterious encounter. In the 'Handbook for Syria and Palestine,' p. 322, it is remarked that "about three hours north of Sūf is a ruin called Mahneh, which may perhaps occupy the site of the Mahanaim of Scripture." From the incorrectness of the map accompanying that work, I could not, whilst on my journey, at all make out that I was near this "ruin called Mahneh;" but, on laying down my route since my return to England, it seems to me that Mahneh cannot be far distant from the locality which, when on the spot, I attributed conjecturally to Mahanaim.

As we proceeded, all the mountains in the north of Palestine opened on us by degrees, whilst on the other hand the prospect gradually closed in towards the south. The whole ground now became covered with stones, and several rude heaps of them stood about. We shortly came to a *cromlech*, strikingly resembling Kits-Coity-House near Maidstone. This remarkable memorial of the eldest family of the descendants of Noah is formed of rough unhewn stones. The top stone is about 8 feet long, 6 feet broad, and rather more than 1 foot thick, very irregular above, but flat below, its lower face being about 3 feet 6 inches from the ground. The three upright stones are quite polished on the inside from rubbing, but whether by animals or by human beings I cannot say. It faces nearly north, and the back stone is placed so as to leave a recess behind it about one-third as deep as the front recess. It stands in the midst of a heap of rough stones.

Soon after passing this *cromlech*, we reached the village of Mezār. We had not intended to stop here, but merely to change our guide. It happened, however, that Hammed (Mohammed Emin) Beg, *mutsellim* or governor of Jebel Ajlūn, was in the place, and on the point of leaving for the neighbouring village of Tibne. On hearing our request to the sheikh for a guide, he immediately took upon himself most kindly to forward us on our journey, saying it was not safe for us to go alone. He accordingly gave us a couple of *bashi-buzûks* to escort us to Kefrenji, where he said he would himself join us on the following evening. Our intention had been to sleep that night at Ain-Jenneh, but as the delay at Mezār would have made our arrival too late, we decided on remaining where we were. We did not, however, go into the village, but pitched our tents at a little distance outside.

Here we passed a delightful day, the weather being beautiful

* Gen. xxxi. 55, xxxii. 1, 2.

(astonishingly so for the time of year), and the prospect all around most lovely. On the one side we commanded a fine view beyond the Jordan over the whole of Galilee, and on the other we had almost as extensive a prospect of the plains of Hauran. The snowy summit of Hermon was also visible, and beyond it, to the left, the southern portion of Lebanon above Sidon, likewise white with snow. We felt ourselves here to be already within the Promised Land; and so likewise must the two tribes and a half beyond Jordan have felt themselves, for all these sights were as familiar to them as to their brethren within the Land of Canaan. It was not the river Jordan, but the ridge of Mount Gilead, which formed the natural boundary of the possessions of the children of Israel. Viewed in this light, the covenant between Laban and Jacob at Mizpeh, on the summit of Gilead, acquires a peculiar significance: "This heap be witness and this pillar be witness, that I will not pass over this heap to thee, and that thou shalt not pass over this heap and this pillar unto me for harm." *

On the following morning we started soon after eight o'clock, passing through a country covered with oaks of two species, one of which is evergreen. The difference between the eastern and western sides of Mount Gilead is most remarkable, the latter being as well wooded as the former is destitute of trees. The beauty of the country, together with its excellent pasturage, renders intelligible the desire of the two tribes of Reuben and Gad, with the half-tribe of Manasseh, to possess it for their numerous flocks and herds; whilst the mast of its oaks must have made it at all times a country peculiarly adapted for swine. A few miles only below us was "the country of the Gadarenes, which is over against Galilee," where was the "herd of many swine feeding on the mountain," which "ran violently down a steep place into the lake."

Beautiful as is this country, it is incessantly exposed to the inroads of various Beduin tribes. The Beni-Sakhr and Aduān are those whose depredations are most frequent, and on our road we passed the graves of two sheikhs of Kefrenji, who had recently been slain in battle with the latter.

About two hours and a half after our departure from Mezār, we came to where the road to Sūf and Jerash branches off from that to Ain-Jenneh. We took the latter, proceeding along the ridge of the mountain, where we enjoyed a magnificent view of the mountains of Hauran, and beyond them the snowy summits of those of Safa. Behind us was the giant Hermon, visible everywhere, in like manner covered with snow; and then, after a brief interval, we caught a glimpse of Tabor with the mountains of Shechem and

* Gen. xxxi. 51, 52.

Gilboa, and again west of the Plain of Esdraelon the distant range of Carmel.

We now began descending over undulating ground covered with fine grass, well wooded, and studded with small lakes. In all directions were flocks of goats, the shepherds keeping which were all armed with firelocks. At 1 P.M. we came to a large spring bursting out from under the rocks, forming at once a tolerably large rivulet. A little lower down was another, larger than the first, so that the two made together a considerable stream. This was Ain-Jenneh, at the head of Wady Ajlûn, the village of that name being situate a little higher up. We now proceeded rapidly down the bank of the stream, till we came to the village of Ajlûn, where we gained a fine view of the neighbouring castle of Râbbâd, fast falling into decay, like the once powerful family of Barakat, its owners, now represented by the sheikhs of Kefrenji. At Ajlûn we were met by Sheikh Diab ibn Freikh, the eldest son (I believe) of Sheikh Durgan of Kefrenji, with an attendant, who from his colour and appearance might well be taken for a Nubian, though he was only an Arab of the Ghor. Diab had received orders from the mutsellim to meet us here, and to escort us to Kefrenji. On our road down we passed an aqueduct carried over the stream on a single arch.

At Kefrenji we pitched our tents and awaited the arrival of the governor. Sunset, however, having passed without our seeing or hearing anything of him, it became necessary to think of making arrangements for the morrow. We had a letter to Sheikh Diab from the British Consul at Damascus, but, being already under the protection of the mutsellim, we did not deem it expedient to show it. The sheikh, to our disappointment, threw every obstacle in our way. The Jordan, he said, was so swollen by the rains as to be quite impassable; it was 5 or 6 fathoms deep; there was no ford or bridge thereabouts; the Beni Aduân, with whom he was at enmity, were on the Zerka; and in fact there was nothing for us to do but to go up to Jisr Mejâmie, near the Lake of Tiberias, and cross the river there. We did not at all like the idea of thus turning away from our projected route, but there appeared to be no remedy. All at once the scene changed. A messenger arrived from Tibne with letters from the governor to myself, to Sheikh Durgan, and to Sheikh Sa'd of the Mashalka Arabs. His letter to me expressed his regret at not being able to come to Kefrenji as he had intended. To the two sheikhs he gave peremptory orders to see to our immediate and safe passage across the Jordan. On this all objections ceased, and Durgan expressed his readiness to escort us down into the Ghor early next morning. During the night a numerous guard was placed in front of our tent; where they sat round a large fire,

talking, singing, playing on a one-stringed fiddle, and making such a noise as effectually to prevent our sleeping. Being intended as a guard of honour, we were hardly warranted in complaining.

Next morning (January 7th) we started at half-past eight, escorted by the two soldiers of the mutsellim, Sheikh Diab, and the sheikh who had brought the letters from Tibne, and who went down to the Ghor to deliver to Sheikh Sa'd the mutsellim's letter addressed to him. The descent was at first very steep, but afterwards became more gradual, till, having passed Rajib, said to lie about an hour and a half distant on our left, we came to the brow of the mountain, where we had an extensive view over the plain of the Jordan as far as the Dead Sea, which we could well distinguish by the mist overhanging its waters. We then began a sharp descent within the basin of Wady Rajib; which stream, notwithstanding the assertion of Ritter, whose authority appears to have misled all geographers and chartographers, I find to be altogether different from Wady Ajlûn, it being neither identical with nor a tributary of it, but having its own separate course into the Jordan.

Descending still the valley of a tributary of Wady Rajib, we came in about an hour to Wady Rajib itself, down the bank of which we went for a short distance, when we entered upon the *Ghor* or Plain of the Jordan. Continuing over the plain southward for about a quarter of an hour, we came to a mosque covering the tomb of Abu Obeida, a saint much venerated in these parts, supposed to be the Moslem commander of that name under the second Khalif Omar, who was killed in battle against the Persians in the 14th year of the Hejira (A.D. 635). It is mentioned by Ibn Batuta, Burekhardt, and Molyneux, as also by Buckingham, under the name of "Abu el Beady." Passing by this mosque, we continued westward over the plain for about an hour, till we came to a steep descent, which brought us into the lower plain of the Ghor, being that through which the Jordan has its course; and in about a quarter of an hour more we reached the encampment of the Mashalka Arabs, situate at a short distance from the bank of the river. Commander Lynch, of the United States Navy, in his official 'Report of the Dead Sea Expedition,' when he had descended the Jordan to about where we now were, says:—"We had now reached a part of the river not visited by Franks, at least since the time of the Crusades, except by three English sailors, who were robbed and fled from it a short distance below." This alludes to Lieut. Molyneux's party, who were attacked close by here, as related in the 18th volume of the 'Journal of the Royal Geographical Society,' and respecting whom Lynch, in his diary of the next day, has the following entry:—"About an hour after starting, we came to the place where the lamented Molyneux's boat was attacked while he was journeying down by land."

There is no doubt we were in a villanous neighbourhood. Burckhardt, when passing across the country a little higher up, remarks that "a stranger, who should venture to travel here unaccompanied by a guide of the country, would most certainly be stripped." Buckingham speaks of Wady Ajlûn, by him called Wady Fakâris, down which we had just come, as being "so notoriously infested by robbers, that persons scarcely ever pass through it, even in large parties, without being attacked, and it was thought madness for single travellers like ourselves to attempt it." It was not only close by here that Molyneux's men were attacked, but it was by the very Mashalkas—by him called Messallieks—among whom we now were. Capt. Lynch further reports that he and his companions were in expectation of a skirmish with "some strange Arabs, supposed to be a marauding party," who "were believed to belong to the tribe Mikhail Meshakâh, whose territory was thereabouts;" that is to say, these very Mashalkas again. Sheikh Sa'd, whom I suspect to be the worthy individual with whom poor Molyneux could not come to terms because "his charge was very great," told our dragoman, in the course of conversation, that, had he not received such a peremptory order from the mutsellim to convey us across the Jordan, he would not let us pass for less than 5000 piastres—nearly 50*l.* sterling.

Considering the bad repute of this portion of the Ghor, which will not allow of loitering by the way, it is not surprising that even in the most modern maps it should be represented very incorrectly. Still the materials for its rectification are not altogether wanting, only they have been misunderstood and misapplied. Not having, before I left home, given any special attention to this particular portion of our intended route—having, in fact, taken for granted that Kiepert's map in Murray's 'Handbook' was sufficiently correct for all practical purposes—I was not a little annoyed on my arrival in this neighbourhood to find myself quite at sea. Dr. Kiepert himself, however, is hardly to blame: he has only followed his "authorities," and in particular the erudite Carl Ritter, who in his 'Erdkunde (Palästina und Syrien)' has seemingly exhausted the subject by his laborious and in many respects admirable analysis of the various sources of information. Unfortunately, his subsequent combination and adjustment of the materials supplied by his various authorities are most defective, and have induced the errors which have misled subsequent geographers.

The following are a few emendations which I would venture to suggest, subject to verification by competent observers on the spot:—Wady Ajlûn (crossed by me) is in its lower course called Wady Fakâris (Buckingham), Fedjarith (De Berton) or Fajâris (Lynch): its junction with the Jordan is in about 32° 13' N. lat. Wady Rajib (likewise crossed by me), of which I take the upper course to

be Wady Arabûn (crossed by Dr. Wetzstein), is, as I have already stated, an independent tributary of the Jordan, which it enters in about $32^{\circ} 10' N.$ This is also the latitude of the mosque of Abu Obeida, situate on the south side of Wady Rajib. Wady Zerka, the Jabbok of Scripture, enters the Jordan in about $32^{\circ} 03' N.$ lat.

The ford of Wady Zerka was said to be about an hour and a half or two hours to the south of the place where we crossed the Jordan: it is on the upper plain, namely, that on which is the mosque of Abu Obeida. This is the "Ford Jabbok," where, before crossing over to meet his brother Esau, "Jacob was left alone, and there wrestled a man with him until the breaking of the day . . . and Jacob called the name of the place Peniel." * After his meeting with his brother, Jacob, professing to accompany him, journeyed to Succoth, "leading on softly," and there stopped to "build him an house and make booths for his cattle," whilst "Esau returned that day on his way unto Seir;" † and Succoth I consider, therefore, to have been situate at a short distance to the south of the Jabbok, on the east side of Jordan, and not on the opposite and farther to the north, where it has been placed by other travellers.

Where we ourselves crossed the Jordan, a little to the south of the junction of Wady Rajib, I made the altitude of the stream, by the boiling of water, to be 1174 feet below the level of the ocean: Commander Lynch, at nearly the same place, made it 1049·44 feet. According to Drs. Wetzstein and Doergens, the depression of the bed of the river about $12'$ in latitude lower down its course is 1100 Paris, or 1172 English feet.

On arriving at the encampment of the Mashalka Arabs, we were at once taken into the open space round which the tents of the tribe were pitched, and told that we must remain there for the night. As it was yet early, we were desirous of crossing the Jordan at once, and went to the bank of the river to see whether it might not be done. The rains having ceased during the last few days, we found the water to have fallen materially, and far from being so high as had been represented: at the same time it was manifestly impracticable to ford the river, or even to attempt to cross it without proper means. These Sheikh Sa'd promised to provide for us next morning; but nothing would induce him to move that day, so we returned to the camp. Here he made us pitch our tents in the open space immediately in front of his own, alleging that it would not be safe for us to remain outside, or even far away from him. Our place of encampment was indeed a most wretched one. The tribe having been stationed here for some time, the whole ground was saturated with the filth of the cattle, of which this was the

* Gen. xxxii. 24-30.

† Ibid. xxxiii. 14-17.

night-layer, which in this heated atmosphere was most offensive. At sundown the mountain-sides became covered with animals of all descriptions returning home for the night. All were brought within the circle of the tents, and in a very short time the entire space around us was crowded with sheep, lambs, goats, kids, cows, asses, horses, camels, fowls, and dogs, to say nothing of insects of many kinds. The smell and the heat from the animals were intolerable, and the noise made by them and by the frogs in the swampy ground around us kept us awake the whole night. It was not till nine o'clock next morning that we left the camp, going a little way up the bank of the river to the ford. The water had fallen even since we were there the afternoon before, as was shown by sticks placed by the Arabs in the mud along the water's edge. Could we only have ensured a week's fine weather, we might have forded the stream on our horses. In its actual state the current was very rapid, and the passage a dangerous one. On reaching the bank of the river, Sheikh Sa'd set his men to work to cut down brushwood for a raft; whilst the women of the tribe inflated water-skins, which were placed in the interstices of the branches forming the raft, and the whole tied together. This rude contrivance was at length launched, and by means of it, guided by a band of naked men and boys, our baggage, our people, and at length ourselves, were conveyed across the river: not without everybody and everything getting thoroughly wet, and indeed not without danger to our lives; for, on our own passage (being the last), the raft was so heavily laden that it nearly capsized when in the most rapid part of the current; and it would have done so, no doubt, if my wife had not righted it by throwing herself off into the water, whence she was rescued by our attendants, who (to do them justice) were, as far as lay in their power, most attentive and anxious to take care of us.

I have already mentioned that the attendant of Sheikh Diab ibn Friekh, who met us at Ajlûn, was so black that we at first took him for an African. We noticed the same peculiarity among many of the Arabs about us here; and I observe that Lieut. Molyneux, in describing the Beduins by whom his sailors were attacked, says that "two-thirds of these men were blacks, belonging to the tribe of the Messallieks." It is desirable to ascertain whether this negro appearance is peculiar to this tribe alone, or is common to the other inhabitants of the deep-sunk valley of the Jordan. Should it be general, it would apparently have to be attributed to causes similar to those which have operated in producing the negroes of Africa, as also the Papuans or Asiatic negroes, in accordance with the principles enunciated in '*Origines Biblicæ*.'

On our arrival on the western side of the Jordan, everything belonging to us was found to be so thoroughly wetted, that it was

impossible to think of moving till they were in some measure dried by exposure to the sun and air. In fact, we could not load the mules on account of their pack-saddles being saturated with moisture; we therefore pitched our tents and remained where we were till the following morning. Sheikh Sa'd, who had accompanied us across the river, was induced by us to remain here all night with a party of his tribe, for the purpose of guarding us against any hostile attack. He gave us, however, to understand that he would not undertake to protect us on this side of the Jordan after we had left him, and that the utmost he could do would be to furnish us with a guide to show us the road to Nablûs.

I have mentioned that while we remained encamped on the eastern side of the Jordan, the waters of the river continued to fall sensibly: we had hardly crossed when it threatened rain, which was not long in making its approach. During the night the rain was incessant, and on rising in the morning we found the river so swollen that it would now have been impracticable to make the passage, which the brief interval of fine weather had fortunately enabled us to do only the day before; and not merely so, but for several days afterwards the rain continued almost without intermission.

It was half-past nine before we were able to leave the bank of the river, taking with us a guide whom Sheikh Sa'd had found for us. We had not proceeded far when we were joined by a second man, who volunteered to accompany us in the place of the other. Our road lay for a few minutes across the lower plain and then ascended to the upper one, along which we continued, gradually approaching the high country on our right hand. When we left our encampment we had wished to go straight up a path running almost due west, but were told that we must proceed for some distance southward along the Ghor. Having, however, our misgivings, we were urgent on our guides to turn up the mountains; and a good deal of discussion took place between them and our dragoman, which had the effect of causing delay. There is no doubt in our minds that all this was planned, and that Sheikh Sa'd and his Mashalkas had more to do with what now ensued than they would be willing to own.

In little more than an hour after we had started, and just as we were turning a point of the rocks, we looked back for our guides, who had lingered behind, when to our dismay we perceived a party of mounted and armed Arabs advancing on us at a furious rate. So close were they before we were aware of their approach, that we had barely time to draw out our revolvers when they were upon us, brandishing their spears and threatening to kill us. As we had carefully concealed our revolvers, of which we had two pair, and also a pair of pocket-pistols, it had not been known in the camp

that we carried any firearms except a double-barrelled fowling-piece. The Beduins were, therefore, not a little surprised to find us armed to the teeth,—we had in all 26 bullets at their service,—and they consequently in all their movements kept at a respectful distance from both my wife and myself.

The moment the alarm was given, our dragoman called out to his people to make for the mountain, which they did in the most complete disorder, every one caring for himself only, in spite of all our endeavours to keep them together under the protection of our firearms. Our cook, who led the cavalcade mounted on a horse which carried his pots and pans, galloped off and was soon quite separated from the rest, which made him the first victim. Two of our assailants were on him in a moment, and before my wife, who was the best mounted of our party, could get to his assistance, he was stripped. The muleteers had started their mules westward up the mountain, and then ran away to hide themselves among the rocks. The mule carrying the few provisions which we had saved out of the Jordan and our bedding, slipped its load, and this was in like manner pounced on by the Beduins. Our dragoman, armed with my wife's fowling-piece, which she had given to him as soon as we saw the Beduins, galloped forward to protect the luggage, when one of the Beduins threw his spear at him, which passed through his waistcoat and coat and cut his hand, entering the butt-end of the fowling-piece and dragging him to the ground. Rendered desperate by this, he rushed to me for one of my revolvers, with which he shot his assailant's horse: my wife, galloping up to his assistance, also fired upon them. Seeing themselves so warmly received, the Beduins now proposed *khūweh*, or "brotherhood," which our dragoman at once agreed to; though rather against our inclination, as we should have preferred driving them off altogether. However, it was better that the conflict should be brought to a close, as first one and then a second of the Arabs had gone up a prominence of the rocks, as if looking out for the approach of a reinforcement, if not for the purpose of making signals for one. The whole affair did not last half an hour.

As soon as the Beduins had received their *bakhshish*, which our dragoman gave them,—for we would not, though of course we had to make it good to him when we got to our journey's end,—the fellows rode off, and we continued our course westward straight up the steep side of the mountain, forming the bluff between the Ghor and Wady Fār'a, known by the name of El-Makhrūd. At noon, a short time before reaching the summit, we caught a glimpse—a Pisgah sight—of the waters of Wady Zerka, the Jabbok of Scripture, which we had not been permitted to reach, much as we longed to do so. On attaining the summit of the Makhrūd, we gained a fine view of the fertile plain of Wady Fār'a; but there was one

feature of the landscape which we could not admire, namely, a large party of Arab horsemen at some distance below us on the left, who we feared were on the look-out for us. Keeping as much as practicable along the side of the mountains, and moving as silently but as quickly as possible, we continued up the valley of the Fār'a on a general course of about north-west, till we had to descend to cross the stream; after which we continued up the other side, and then proceeded westward, till at 4.45 P.M. we arrived at the village of Beit Dejān, occupying the site of an ancient town, the remains of which are deserving of being thoroughly explored.

On the following morning (January 10th) we left Beit Dejān, crossing the fertile plain of Sālim (Shalem) to Nablūs—the Shechem of Scripture,—which city we reached soon after noon. Arrived at this well-known place, it is unnecessary to say anything respecting our further proceedings, except that from Nablūs we went to Jerusalem, and thence to Jaffa on our way home.

As the object of our journey from Harraṇ had been to follow, as closely as possible, in the footsteps of the Patriarch Jacob, it is proper, before concluding, to remark that, after he had left Succoth and crossed the Jordan (as explained in a preceding page), he would have entered Wady Fār'a at its junction with the Ghor, passing between the Makhrūd and Kārn Sārtebeh; and that, continuing up the valley, he would at length have fallen into the road taken by us, by which he “came to Shalem, a city of Shechem, which is in the land of Canaan, when he came from Padan-Aram, and pitched his tent before the city.”

Bekesbourne, May 7th, 1862.

IX.—*The Hermon, and the Physical Features of Syria and Northern Palestine.* By JOHN WORTABET, M.D.

IN all the geographical researches made in Syria and Palestine there has not been given, as yet—with the exception, perhaps, of an article by the Rev. J. L. Porter (*'Bibliotheca Sacra,'* Jan., 1854*)—a full account of the Hermon, and of the truly grand and panoramic scenery which may be seen from its highest peak. And yet it is from the top of this mountain alone that we have the best observatory, from whence the general and well-defined outlines of a large part of Syria and Northern Palestine may be taken in one long and comprehensive sweep of the eye.

The highest peak of the Hermon may be reached from three different places. The first is Kal'at Jendal, a village lying to the

* See *'Royal Geographical Journal,'* vol. xxvi. p. 43.—Ed.

east of the mountain, and perched on one of the hills which form the basement of the high-towering Hermon. This starting-point has the advantage of being situated on one of the high roads from Damascus to Hasheiya. The traveller from Damascus, therefore, as he crosses the ridge of the Hermon at a point about an hour and a-half south from the highest peak, instead of making the descent on the west, takes a path to the north. The *second* is Rasheiya. The road is very steep, and makes the ascent of several thousand feet in about three hours. The *third* is Hasheiya, and the journey up takes about six hours and a-half. This, by far, is the easiest and most convenient to the traveller coming from the south; and his best plan would be to go by Shwaiah and Ayun Jin'im—the Shib'a route being very craggy, unsafe, and extremely fatiguing.

The distance between Hasheiya and Ayun Jin'im is about three hours and a-half. The traveller, after leaving Shwaiah, a village on the eastern part of the mountain-range which forms an amphitheatre around Hasheiya, ascends the mountain to the east, and, after traversing it in a north-easterly direction, descends into a wady which runs to Shib'a on the south and Rasheiya on the north—the road connecting these two places lying in the wady. The fountains, which have given their name to the place ('Ayun), consist of a few ditches filled with dirty water, which exudes slowly in two petty puddles. The ditches serve to collect the water, and were apparently made by the goatherds for watering their goats, which browse for a large part of the year on the sides of the Hermon. The elevation of Ayun Jin'im from the sea cannot be much less than 5000 or 6000 feet.

The road from the fountains up the mountain takes an easterly direction, and lies in a kind of gorge, which, however, gets obliterated as we approach the ridge or back of the Hermon. The sides of this gorge are covered with the shrub tragacanth, from which large quantities of gum are collected by the peasantry, and sold in the markets of Damascus. This shrub rises from one to two feet high, with a thick stem and numerous closely-crowded and spreading branches, which give it the appearance of a small umbrageous tree. The gum exudes in the summer, and is aromatic.* It was once extensively used in medicine, and, though now still found among the articles of the 'Materia Medica,' very little use is made of it. By the natives of the country it is chiefly used in the arts. This gum tragacanth is supposed to be the נֶחֱוֹת (Necôth) of the Scriptures, translated in the English Version *spice*, and mentioned in Genesis xxxvii. 25, and xliii. 11, as a kind of spice imported to Egypt from Syria. The chief argu-

* The gum tragacanth of Asia Minor is very tasteless and insipid.—W. J. H.

ment that this gum is the Necôth of Scripture is the observable identity of the Hebrew word with the Arabic name نَكَة (Nekat), or نَكْعَة (Nek'at).

As the traveller approaches the back of the ridge the tragacanth disappears entirely—almost suddenly—and a strange-looking bush takes its place. It has the very remarkable appearance of a little mound, varying from an inch in diameter to three or four feet. It never grows higher than two feet, and is covered in summer with very pretty red florets, each of which is attached to a sharp-pointed thorn. About half-way up there is what is called a fountain (Ain Sabrun), but which hardly deserves the name, being a very slow and scanty exudation of water into a very small puddle. The ascent from Ayun Jin'im to the back of the ridge takes about one hour and a-half, and is quite steep throughout, though one is not obliged at any time to dismount in going up. In descending, it is optional with the rider. The elevation from the fountains of Jin'im is probably between 2000 and 3000 feet.

Up to this point the road lies in a well-beaten track, which is followed by the neighbouring villagers to and from Damascus; caravans of mules rarely take this route, owing to its steep and rugged character. On reaching the ridge the traveller strikes for the highest peak in a northerly direction, taking the easiest passes among the summits which lie between him and the top, and generally ascending as he approaches it. The Hermon is wholly covered with snow during the winter and the earlier part of the spring; in the latter part of the spring it gradually dissolves, leaving the long fissures and chasms of the mountain glittering with the white element. Whether these long white streaks, like the grey hairs of age, have gained for it the name of Djebel el Sheikh (the Old Man's Mountain), or its hoary appearance in winter, or the princely attitude which it holds in the estimation of the people among the mountains of Syria, is altogether uncertain. As summer recedes and autumn advances, only a few large banks of snow remain in shaded positions; the surface thus brought to view has the appearance of utter barrenness, with only a few thorny shrubs to be seen on it. Hardly a bird or any other animal seeks its food amid the sterile elevation. Nor is cultivation attempted at a point higher than some 3000 feet from the top. It takes about one hour and a-half to reach the highest summit from that point on the ridge where the traveller, leaving the Damascus road, strikes to the north; thus making the distance from the fountains of Jin'im just three hours.

The height of the Hermon has not yet been satisfactorily ascertained: while some have put it as low as 8500 feet, others raise it to over 12,000. And so in reference to the comparative height

of Mount Lebanon and Mount Hermon. It was generally supposed at one time that the latter was higher than Sunnîn, which was also supposed to be the highest point on the Lebanon; but of late this summit was found to be at least 500 feet lower than that which towers above the Cedars (Mekmel), and which was found to be about 9175 feet high. Brande, in his 'Dictionary of Science, Literature, and Art' ("Mountains"), gives the height of Lebanon as 9520 feet. Dr. Kitto, computing from the data that the point of perpetual congelation in Syria is 11,000 feet, makes both the Sunnîn and the Hermon a little above this number, though he inclines to the opinion that the latter is the loftier of the two. This view is corroborated by the testimony of many travellers, who assert that from the outskirts of Syria and from the sea the top of the Hermon is seen first and last; and we may add that the natives of the country believe, apparently on the strength of this fact, that the Hermon is the highest. According to the measurements of some of the American missionaries with the aneroid, Hermon is made out to be 9500 feet; Mekmel, the highest summit of the Lebanon, some 300 feet lower; Fum el Mizab about 9000, and Sunnîn about 700 or 800 feet lower than the Hermon. These numbers are probably not far from the truth, and in the present state of the question they are the most reliable of any we have. The late lamented Dr. J. R. Kôth, who arrived in the summer of 1858 to take the altitude of the Hermon with the most perfect instrument of its kind, died at its foot without having accomplished his object.

On reaching the summit are the remains of an old building around a rocky eminence at the highest point or apex of the peak. No part, however, of the ancient edifice remains except a few large and well-cut, but unlevelled, blocks of stone strewn about; but in such a way as to lead to the supposition that a wall once encircled the rocky projection. Most of the stones lie at the base of the peak, several thousand feet below to the east, the mountain being very steep and smooth on that side. We are not aware that any columns or capitals exist among the *débris*, certainly not on the summit itself. The only other work of art there is a subterraneous cavern cut in the rock, about 100 feet to the north. Judging from the site and the character of the stones, the building on the peak was probably a temple; and the cavern, which forms a large and convenient room to live in, was apparently used by the priests as a shelter from the cold piercing winds, which make the habitation of the mountain even in midsummer very uncomfortable. May this have been the Baal Hermon of the Scriptures? The ancient idolaters of Syria chose the sites of their temples most generally in some wild region of Nature, and on some highly-perched peak or cliff of a mountain; and hence "to eat upon the

mountains" (Ezekiel xviii. 6) was an expression equivalent to a participation in idolatrous worship. Now, the Hermon has a large number of temples built on the hills and in the country which lies at its base. The following are a few of them:—the temple of Pan, in Banias; the temple in Hibbaryeh, where in the inscription the name of the god is, however, illegible; and the beautiful temple of Ain Hersha, with a bust and full figures of Diana, and the following inscription:—

ΑΛΗΗCΒΗ ΘΕΟΔΩΡΟΣ ΕΑΡΑΔ ΙΕΡΕΥC

If Baal Hermon, therefore, was a temple, no better site for eminence and extent of scenery could be selected than our summit. Gesenius, however, controverts this meaning of Baal Hermon, and believes it to represent a town near Mount Hermon; and certainly the way in which this place is mentioned in 1 Chronicles v. 23, as being geographically distinct from the mountain, is in favour of the view which he takes. We must reluctantly give up, therefore, the fine idea that the temple which once crowned the highest peak of the Hermon is not the Baal Hermon of Scripture, but some temple of perhaps, a later date, dedicated to some Syrian god unknown to us.

The panoramic scenery which unfolds itself to the view of the traveller from this elevated observatory is truly magnificent; and he feels himself fully repaid for all the trouble and toil of the journey as he surveys the whole country lying at his feet, and all its physical outlines boldly and clearly defined. The blue Mediterranean lies to the west as far as the eye can reach: in one part its shores invisible, from the intervening mountains; and in another its white foam, as it breaks itself against the mainland, looks as if the coast of Syria were limned with the artist's pencil. The majestic Lebanon is stretched before the observer, and allows him to note its rise and progress and fall—its ridges and peaks and breaks—its eastern base, its rise in the north, and its losing itself among the hills of the south. The irregular anti-Lebanon meeting the Lebanon on the north, and with it enclosing the fine plans of Cælo-Syria, stretches itself to the plains of Damascus; the Hermon, standing over against the southern part of Lebanon, is divided from it by Wady el Taym; the hilly and undulating country of the Metawileh, extending on the west as far as the sea, terminates on the east with a high and abrupt ridge, which forms the western wall of the basin of the Hûleh; the eastern, over against it, beginning the fine tableland of the Gaulanitis. Djebel Safet and Djebel 'Ajlûn, the Lake of Tiberias, Mount Tabor, the country of Nazareth, the plains of Esdraelon, Mount Carmel, the mountains of Nablous, are more or less distinctly seen to the south. To the east, the Hauran ridge, Damascus and its plains, the wide valley which separates

the Hauran from the Hermon, the Gaulanitis, and Ajlûn, the hilly Iturea (Jaidûr), the plains of Bozrah—all these combine to give the observer a definite and clear geographical knowledge of the mountains and valleys and plains of Syria and Northern Palestine, for which he can find no adequate representation on the maps and in the books of the most accurate travellers. The latter part of the spring and earlier part of the summer are the proper times for making the visit to the best advantage. After the flow of the Nile the atmosphere gets hazy, mists settle on the mountains and plains, the vision is obscured, and large portions are sometimes completely veiled from view. The cold also in the other seasons of the year is intense. In my last ascent, although it was a very hot sirocco below, the wind on the top was so piercing that we danced with the cold.

Let us now take a more analytical view of the well-defined outlines of the mountains and country as they are seen from the top of the Hermon.

The Hermon itself, as viewed from its highest summit, extends N.N.W. by S.S.E. Its true northern boundary, we apprehend, is a large wide chasm to the east of Rasheiya, which divides it from the Anti-Lebanon range; to the south, it runs as far as Banias and the Jawlan; while on the north it has the form of one large mountain: on the south it gets broken up, and at one place, where it runs to the Jawlan, it has the distinct name of Djebel el Heish. On both its eastern and western sides there are ridges and groups of hills which run along with it, and whose slopes and valleys are cultivated and populated. The eastern is called Aklîm el Bellan, and the western Wady el Taym; the fissure here between the Lebanon and the Hermon having the appearance of a great valley. The whole length of the Hermon cannot be more than 20 miles.

The Anti-Lebanon sends a branch of mountains to the north-west. This is met by an extension of the Lebanon, which runs there a little to the east; and thus a kind of junction is apparently formed between the two mountains. A wide pass, however, continues to separate them, at the same time connecting the plains of Cœlo-Syria on the south, with the plains of Hamah on the north. Indeed, it forms a natural gateway to the latter, and, in our opinion, defines itself to be clearly the "entering in of Hamath" of Scripture. The other branch of the Anti-Lebanon extends as far to the south-east as the chasm which separates it from the Hermon, thus skirting the plains of Damascus and forming their western boundary.

Looking to the west from our standpoint, the Lebanon lies stretched for a long distance north and south; but it is observed to be much higher in its northern than in its southern portions. It

is also somewhat longer than both the Anti-Lebanon and the Hermon together. In its more northern extremity it has three distinct elevations, divided from each other, and which point more or less east and west. The first, Djebel Mekmel, is found from barometrical measurement to be the highest, and forms a kind of amphitheatre facing the west, and hanging over the Cedars; the second is the famous Sunnîn, for a long time considered the highest peak on the Lebanon; and the third is Kunayseh. The mountain then extends to the south in a smooth, uniform ridge as far as a point to the south-west of Deir el Kamar—the principal town of the Lebanon—where it abruptly breaks to a slightly diminished elevation. The depressed ridge continues its even course for some distance, and then bifurcates into two branches: the eastern bearing Yawmat Niha—two conical peaks often noticed by travellers—gets broken up near Jisr Burjos on the Leontes, to the west of Sûk el Khan. The western branch is called Djebel el Rihan, descends into a lower group of mountains, assumes the shape of a tongue, and loses itself in the hilly country of Belad Shukeif. The Shukeif itself is properly a low continuation of the Lebanon, with the Leontes, as it turns westward, forming its southern boundary; but, as it is inhabited by a different people, this physical division is not regarded, and the Lebanon is made to terminate at the southern limits of Djebel el Rihan, between which, however, and the Shukeif there are well-marked valleys, and in one place a small stream, El Zahrany.

Belad el Shukeif is a high table land studded with gently undulating hills, and is bounded on the north by the valleys and the stream Zahrany, which divide it from the Lebanon; on the east and south by the Leontes, which runs close at its base; and on the west by the Mediterranean. The western portion of this district is called Aklim el Shumar. The most conspicuous object seen at a distance is its castle—Kalaat el Shukeif—known in the time of the Crusaders by the name of Belfort, the largest, and probably the most ancient in Syria. The whole district is noted for the heavy dews which fall on it; and this circumstance is turned to account by the inhabitants in the cultivation of tobacco, an article which they raise in large quantities, and which forms a principal source of their livelihood.

Belad Beshara is a more hilly and wild *tahlen*, and is divided from Belad el Shukeif by the Leontes, which runs between them east and west. It is divided into three districts—Djebel Hunîn, Djebel Tibnîn, and Sahil Maarakeh—all lying parallel to each other, east and west. Djebel Hunîn forms the western border of the basin of the Huleh, and runs to the south as far as the mountains of Safet, from which it is divided by a valley called Ūba.

From Djebel el Riha to Safet the country is inhabited by the Metawileh—the Sheite Mohammedans of Syria—and, in the times of the Jewish Commonwealth, was possessed by the tribes of Naphtali and Asher. It is remarkable for its scanty provision of water. Belad el Shukeif, Djebel Hunin, Djebel Tibnin, and Sahil Cona—the latter to the south of and included in Belad Beshara—have each a separate Governor nominated by the Pasha of Beyrout.

We shall now return to follow to some distance the great valley which separates the Lebanon on the one side and the Anti-Lebanon and Hermon on the other, and which increases in depression as it runs to the south, until this depression reaches its ultimatum in the Dead Sea. But a small portion of Cœlo-Syria is visible from our standpoint; owing to a part of the Hermon and a part of the Anti-Lebanon range covering it from view. On the north, however, it is seen beginning at the pass which divides the Lebanon and the Anti-Lebanon as they approximate to each other, a little north of Baalbec. These two mountains form its eastern and western borders; and it ends on the south, at a line with the southern termination of the Anti-Lebanon.

The Leontes, taking its rise in and near Baalbec, meanders through the plains of El Bukaa, till it reaches Jib Jennin, the south-western point of Cœlo-Syria, when it skirts the Lebanon and runs close at its eastern base, as far as Belad Shukeif. There, after keeping its southern course for some distance, it makes a sudden and sharp angular turn, and runs westward to the sea, a few miles north of Tyre; thus forming the eastern and southern boundaries of Belad el Shukeif. From Jib Jennin a high spur of hills rises, which, with the exception of one break at Merj el Shemeiseh, extends as far south as Burjos, parallel to and close by the Lebanon, with only the Leontes flowing between them. Opposite to this spur—that is to say to the east—another range of hills rises near Rasheiya, and, running to the base of the Hermon, terminates at Sûk el Khan, a little south of Hasheiya. Between these two ranges of hills the valley is still of some width—from three to six miles—and its extreme northern and southern points, Rasheiya and Sûk el Khan, make the length about 18 miles. This is the famous Wady el Taym. It is divided into the Upper, of which Rasheiya is the principal village; and the Lower, of which Hasheiya is the chief town; the population of both being about 30,000 souls.

Merj Ayun is another basin or “hollow” formed by two lines of hills which converge on the north and south, and are divided on the west from the Shukeif by the Leontes, and on the west by

the river Hasbany. It is a very fertile plain, and bears on the hills which enclose it some 8 or 10 villages. It is about 4 miles in length, and from 1 to 2 in breadth.

The Huleh is another basin, about 20 miles long, and half as broad; crested on the west by Djebel Hunîn, and on the east by the high tableland of the Jawlan. Here, and about the middle of the plain, the rivers Hasbany, Banissy, and Leddan unite their waters and run into the lake Huleh. These are the two sources of the Jordan—the most remote of them being the Hasbany—though many tributaries increase the volume of water as it flows through the Lake of Tiberias and Ghôr to the Dead Sea.

The Jawlan is a high tableland which rises on the west above the basin of the Huleh, thus forming its eastern border. It begins on the north at the high and southern termination of the Hermon, which is known there by the name of Djebel el Heish, and extends as far south as Ard Fik, from which it is divided by Wady el Samak. Ard Fik is a group of mountains which runs along the eastern shore of Tiberias, and which bears on two of its peaks the village of Fik—the Scripture Aphek (1 Kings xx. 26)—and Kulaat el Husn, the Gamala of Josephus. It is divided from Djebel 'Ajlûn (Mount Gilead) by Wady Shellali. The line of division put on the maps generally is the river Yarmûk.

The Hauran ridge is clearly observable from the top of the Hermon. It begins on the north, at a point south or south-east from Damascus, with the redoubtable Ledja. This is a rocky mass of mountains which lies to the east from our point of observation, and from all accounts seems to be a strong natural fortress, supposed by the Druzes of the Hauran to be impregnable. The Hauran chain stretches in an even line to the south, and terminates a little to the south of the castle called Salkhad—the ancient Salcha. The celebrated Bozra is in the plain, west of Salkhad. The termination of the Hauran mountains is a little south from a line with the southern end of the Lake Tiberias. El Nukrah, El Jaidûr, and El Rekkad are districts which lie successively between the Hauran and the Jawlan. El Kunaiterah is another district, and lies north of the Jawlan; between it and El Jaiden, Wady el Ajam, is the great hilly valley which divides the Hauran from the Hermon. It becomes more open and even, as it loses itself in the plains of Damascus. The lakes into which El Awaj and Barada discharge themselves—the former taking its rise from the eastern slopes of the Hermon—are seen in the distance.

X.—*Narrative of an Expedition to the Andaman Islands in 1857.*

By F. J. MOUAT, Esq., M.D., F.R.G.S., &c.

Read, January 13, 1862.

THE Andaman Islands, lying in the Bay of Bengal, in 93° east longitude, and between the 18th and 14th degrees of north latitude, were first carefully surveyed by Lieutenant Archibald Blair, of the Indian Navy, in 1789 and the following year. His Survey Report has recently been published by the Government of India in the printed Selections from their Records. About the same time (1789-90) they were visited and examined by Lieutenant (afterwards Colonel) Colebrooke, Surveyor-General of India, who published an account of the islands in the 4th volume of the 'Asiatic Researches.' In addition to a general description of the islands, their physical character and inhabitants, his paper contained a brief vocabulary of the Andaman language, in which is comprised all that is yet known on that subject.

In 1789 formal possession was taken of the Andamans by the Indian Government, and a small penal colony was established, under the charge of Lieutenant Blair, at Port Cornwallis, near the southern extremity of the Great Andaman, on its eastern coast. For three years this colony was healthy and prosperous, when, in 1792, it was removed to a larger harbour nearly two degrees to the northward, on the eastern shore of the same island, in $13^{\circ} 28' \text{ N. lat. and } 93^{\circ} 12' \text{ E. long.}$ This harbour was also named Port Cornwallis, when the appellation of the original settlement was changed to Old Harbour. In its new position, the colony situated in Chatham Island was so continuously unhealthy that it was ultimately abandoned in 1796.

In 1795 the settlement was visited by Colonel Syme, who devoted a chapter to its description in the narrative of his embassy to Ava. Port Cornwallis was subsequently visited in 1814, and was afterwards selected as the rendezvous of the first expedition to Ava in 1824.

The first mention of the Andaman Islands is by two Mahomedan travellers, whose account is published in Pemberton's 'General Collection of Voyages and Travels.' In Hamilton's 'Account of the East Indies,' and in the Calcutta 'Monthly Register,' are brief references to the islands and their inhabitants.

Of late little further was heard of them than occasional notices of shipwrecks, which invariably represented the inhabitants as irrefragably savage, implacable, hostile, and inhospitable.

In 1840 the island was visited by Dr. Helfer for scientific purposes. This gentleman was killed by the savages very shortly after

his arrival there, in circumstances of which the exact particulars were never known.*

Subsequently representations were more than once addressed to the Government of India and to the Court of Directors of the late East India Company regarding the outrages committed by the savage inhabitants of the Andamans on shipwrecked mariners. The result of these representations was an intention again to examine the island, with a view to the selection of one or more harbours of refuge.

At this stage of the proceedings the great Sepoy mutiny of 1857 occurred, when it was determined to send a fresh expedition to examine the Andaman group of islands, "with a view to the selection of a site for the establishment of a penal settlement for the reception, in the first instance, of mutinous deserters and rebels sentenced to imprisonment in banishment," and eventually for the re-establishment of a more general convict settlement for felons sentenced to transportation from all parts of the British possessions in India.

Accordingly in November, 1857, a Committee was appointed by the Governor-General of India, for the purpose above mentioned. It consisted of myself, Dr. George Playfair of the Bengal Army, and Lieut. J. A. Heathcote of the Indian Navy. To Dr. Playfair were assigned the medical and scientific duties of the expedition; to Lieut. Heathcote all matters relating to hydrography; and to myself was entrusted the general charge and command of the expedition. The Committee submitted a combined Report of their labours, which was published in 1859 as the 25th number of the 'Selections from the Records of the Government of India,' edited by myself.

The present communication is derived from the Report in question and from the private notes made by me during the expedition, partly from my own observations and in part from the daily record written by Dr. Playfair and Lieut. Heathcote, and placed in my hands from day to day by the officers in question. To them I am so much indebted for facts and observations, carefully observed and accurately recorded, that I am anxious that the present Paper should be considered our joint contribution to the records of the Royal Geographical Society, while I am alone responsible for any errors and imperfections which it may contain.

The expedition left Calcutta on the 23rd of November, 1857,

* The widow of Dr. Helfer was the niece of Field-Marshal Baron Bülw. The facts of Dr. Helfer's death were these:—Accompanied by Madame Helfer, he landed, when a savage concealed behind a bush transfixed him with his spear. The lady, armed like her husband, drew a pistol from her girdle, and shot the murderer on the spot.

in the steam-frigate *Semiramis*, and proceeded to Moulmein, where the war-steamer *Pluto*, an iron vessel of very light draught, well adapted for navigation in shallow waters and among coral reefs, was placed at our disposal. A carefully selected European guard of twenty men from the crew of the frigate, with an officer, was told off by Capt. Campbell, of the Indian Navy, for the protection of surveying parties. Twelve Burmese convicts, with a native guard, well used to forest life, were also made over to us by Major Fyche, the Commissioner of the Tenasserim provinces, to assist in cutting a path through the jungle, in boring for water, and similar purposes. Without the aid of these men and of the crew of the *Pluto* we could have made no progress in our explorations, so dense and impenetrable did we find the vegetation everywhere. To mount the smallest hill it was necessary to cut a path, and we were never able to penetrate more than from 5 to 6 miles in a single day. There were no open spaces for camping, and, as we were without tents, all exploring parties returned on board at sunset. As the savages abounded everywhere—were silent, stealthy, and crafty in their movements—were concealed by the luxuriant vegetation— invariably evinced a determined spirit of hostility, and were well provided with the means of aggression, which they never omitted to employ—all parties engaged in the survey were carefully armed. Every precaution was taken to prevent surprise, and to hold open our communication with the steamer. The sanitary precautions taken were to mix a small quantity of quina in the coffee, issued at daybreak to the men, and to see that they were protected from the sun by suitable covering.

The east coast of the Great Andaman, from Port Cornwallis to the Cinque Islands, was first examined. Rutland Island was then explored, and every point of the west coast as far as North Reef Island was visited that afforded any prospect of containing the requisites for the establishment of a penal settlement. Incidentally the Andaman and Middle Straits were investigated, and a visit was paid to the volcano on Barren Island.

This magnificent, picturesque, and land-locked harbour was carefully explored. It was found to contain excellent anchorage-ground, sheltered from all weathers, with good holding, and could accommodate a very large fleet of vessels of every draught. It was surrounded by low hills, densely covered with vegetation to the water's edge, and abounded in shallow creeks, which were not explored. It afforded an abundant supply of fresh water, one of the rills yielding little if anything less than 500 tons' daily discharge of pure, wholesome, limpid water. It contained more than one bank of palatable oysters, and abounded in shell and other fish. On its shores were a few native huts, of which none of the inhabitants were seen.

The remains of the settlement on Chatham Island were disentangled from the dense vegetation, by which it was concealed, with extreme difficulty. Fragments of the brickwork were found in excellent preservation, but all other traces of habitation were effaced. A few cocoa-nut trees alone indicated the attempt to introduce economical plants not indigenous to the soil. According to Blair's survey, the sea must have encroached on the north-eastern end of Chatham Island some 40 or 50 feet.

On the south-western extremity of the same island was an extensive mud bay, uncovered at low tide, skirted by belts of mangrove, with low flat country on the opposite shore in the same direction. The only sea-surge that could reach the settlement was the north-east wind, which blows over a small portion of the northern aspect. To these causes—to the pestilential nature of the mud-banks when uncovered, and to the abundance of rank, reeking, decayed vegetation in every direction—the excessive unhealthiness of the early settlement was doubtless due.

The expedition next proceeded to Craggy Island, under the shelter of which it anchored for the purpose of exploring the Saddle Peak, the most elevated hill on the whole group. It is about 2400 feet in height, covered with vegetation to its summit, is of considerable extent, and its eastern aspect broken by densely-wooded ravines. Between the shore and Craggy Island was a dangerous reef, rich in shell-fish, which the natives were engaged in gathering at the time of our visit. We anchored at about 3 P.M. So sudden and unexpected was our appearance, that a party of women fishing on Craggy Island was cut off, and unable, from terror and agitation, to launch their canoe, which was drawn up on the beach. They immediately concealed themselves in the vegetation covering the small islet. The men on the reef exhibited frantic signs of hostility, notwithstanding our making every attempt to conciliate them. The canoe was scrupulously respected, and in it were placed looking-glasses, beads, and other articles of savage finery. The same course was pursued with the huts on the main land; but all efforts to establish friendly intercourse were rejected with violence. We had scarcely proceeded a few yards after landing before a flight of arrows was discharged at us. The aggression was repelled by a volley of musketry over the heads of our assailants.

All attempt to examine the peak was abandoned when it was found that the base of the hill was a considerable distance inland, and that it would occupy an amount of time that could not be spared from the main purpose of the expedition. The water-supply from the neighbouring hills was abundant, and the coast in the vicinity well peopled.

The coast from the Saddle to Andaman Strait was cursorily

examined. It was found to be hilly nearly to the water's edge, and to afford no good landing-place. There was scarcely any mangrove, and in one or two places tolerably deep caves were seen.

We steamed through Stewart's Strait and right round Sound Island, which is of an irregular quadrilateral shape, forming one side of a land-locked bay, accessible at all seasons to vessels of every class. The island consisted of ridges of high land, traversing it in all directions, and prolonged in spurs to the point of the bay indenting its margins. It was fringed with belts of mangrove and surrounded by coral reefs, with occasional fine sandy beaches.

Towards its southern end is a horseshoe-shaped harbour, nearly three quarters of a mile in depth, and rather more than half a mile in breadth. Its northern and eastern aspects are skirted by coral banks; but in the rest of its extent it has good anchorage-ground for large vessels.

The ridge of hilly ground surrounding this bay is about 120 feet in height, and furnished an extremely grand and repeated echo on the firing of the evening and morning guns.

The vegetation was much less dense and tangled than we found it elsewhere, probably due to a deficiency of water, which rendered it quite unfit for a convict settlement. A few natives were seen fishing, and the smoke of their fires rose in many directions. Fire was found concealed in the decayed trunks of some of the larger trees, and in various places branches were bent nearly to the ground by means of large stones attached by the tendrils of climbing plants. The object of this practice, which was found to prevail generally, was not ascertained.

The existence of a practicable passage from the east to the west coast of the Great Andaman, debouching at Interview Island, had been left undetermined by Blair. The *Pluto* was next anchored off the mouth of Andaman Strait, and a fast boat, with a strong picked crew, was sent to explore this strait and ascertain how far it was navigable. After pulling through a very tortuous passage for several hours, our progress was arrested by finding that at low tide the mud was exposed in the main channel, and we had very great difficulty in retracing our steps. The swamps and sunderbunds traversed for about a third of the breadth of the island in this place were extremely putrid and pestilential. Vegetation was extremely luxuriant, but confined to mangroves. There was no trace of habitation or of animal life in the dense swamps bordering the strait. The fact of the non-existence of a passage for any useful purpose was fully established.

The Expedition then steered south to the Andaman Archipelago, of which a portion only was examined; Blair's survey showing that the navigation in its vicinity was extremely difficult and dangerous, that it contained no harbours, and was unfitted for a convict settle-

ment. It was on the south-eastern aspect of the largest of the islands of the archipelago that the troop-ships *Briton* and *Runnymede*, with detachments of H. M.'s 50th and 80th Foot, were wrecked in November, 1844. All attempts made on that occasion to hold amicable intercourse with the natives failed.

We then proceeded to Barren Island, which was examined for a few hours. It now contains a considerable amount of vegetation, and from the south appears like a huge hill rising abruptly from the sea. On its north-western aspect is the only practicable opening, from which the cone of the existing volcano is visible. At the base of the cone was a considerable amount of black basalt, and at the landing-place a hot fresh spring was found, of which the exact temperature was not ascertained. From the steam evolved at low water, when a portion of the spring was exposed, it was inferred that the temperature was nearly, if not quite, that of boiling water. The cone was found to be covered with fine ashes, in some places of a light gray colour. It rose at an angle of 40° to a height of 975 feet, and from the truncated apex a small quantity of white smoke was seen to issue. The island is nearly circular, and about 2970 yards in diameter. The ascent was not particularly difficult, and in some places the ground was uncomfortably hot.

A photograph of the cone was taken from the most distant point practicable. No appearance of the sea having ever washed round the base of the cone was detected during our examination. We arrived at the conclusion that the amount of sulphur contained in the crater was not sufficient to repay the cost of working—a conclusion from which Dr. G. Von Liebig differed after a more detailed and careful examination, made four months after our visit. A detailed notice of the geological features of this singular volcano, by Drs. Playfair and G. Von Liebig, is appended to the 25th number of the printed 'Selections from the Records of the Government of India.'

The Expedition next visited Old Harbour, near the extremity of South Andaman, where the first convict settlement was placed in 1789. The original survey of Lieut. Blair was found to be accurate to the minutest particulars here and everywhere else that it was subjected to proof.

Scarcely a trace of the original settlement was found on Chatham Island, and on Ross Island, at the mouth of the harbour, the marks of former occupation were entirely effaced. There was everywhere an abundance of wood, water, and building materials: the rocks abounded in shell-fish, and the harbour with many varieties of edible fish; the soil seemed to be everywhere fertile. There was much less of mangrove and swampy ground than at Port Cornwallis, and on the whole it was found to afford the most promising site for a convict settlement that was discoverable on the Great Andaman.

Several villages were examined, and proofs were found scattered in every direction of its being a popular place of resort for the natives of the island. They avoided us as much as possible, fired at us when we approached near enough to any of their settlements, and resisted every attempt to form a close acquaintance with them.

The name of this harbour has been changed to Port Blair, in honour of the excellent and accurate hydrographer by whom it was first explored, and a new convict settlement has been formed there.

Rutland Island, a fine hilly island at the southern extremity of the Great Andaman, was next explored. It was found to be of considerable extent, well wooded, and abundantly supplied with fresh water. The dense forest covering its southern aspect exhibited marks of exposure to the full force of the south-west monsoon, the trees in many places being uprooted, and for a considerable extent beaten down by the force of the wind. Fragments of wrecks too small for identification were discovered, and it afforded evidence of being tolerably well peopled. The shores were somewhat difficult of access, and, except in Macpherson's Strait, which separates it from the southern division of the Great Andaman, it contains no secure harbour. The Cinque and Labyrinth Islands adjoining it were also visited: they presented no special features deserving remark. In some of them were small canes, containing the nests of the *Hirundo esculenta*, and all the reefs abounded in the *bêche-de-mer*. A larger number of birds were seen than were found farther to the north, many of them closely resembling the humming-bird.

The Expedition then proceeded northward to examine the west coast of the Great Andaman. The passage between the Labyrinth Islands was found to be difficult and dangerous, from the presence of banks of coral, on which account it seems to have been left unexplored by Blair. Nearly opposite to Port Blair an opening was indicated in the chart, which was found to lead to a new harbour of considerable extent, well sheltered, bordered by low hills covered with lofty trees, and containing an abundance of fresh water. Soundings were taken and observations made by Lieut. Heathcote to determine its exact position. Its proximity in a direct line to the westward of Port Blair—about 2 miles, from observation—affords a hope of its being practicable hereafter to open an overland communication between the east and west coasts, and thus considerably to improve the healthiness of the convict settlement by allowing both monsoons to blow across it. An attempt made by Dr. J. P. Walker, some months subsequent to our visit, to cut a path from Port Blair to the west coast, however, failed, from the extreme density of the vegetation and the intervention of an impracticable swamp. The exploring party in this case was surrounded

by savages during the whole of the attempt to open a communication. They did not venture upon any open act of hostility.

This harbour has been named Port Mouat by the Governor-General of India. The shores were lined by villages in several places, and canoes were found in every stage of preparation, from the rough hewn trunk to the finished vessel.

This new harbour is accessible only from the south through the passage between the Labyrinth Islands—a navigation far too difficult and dangerous to be used by vessels in distress during the south-west monsoon. On attempting to run parallel to the coast in steaming northward, the coral reefs, which are here very extensive, were found to be far too near the surface to admit of the passage of a vessel even of such light draught as the *Pluto*, the water shoaling suddenly from 8 to $1\frac{1}{2}$ fathoms. An attempt to stand to sea in the direction of the largest island outlying to the westward, the North Sentinel, failed from the same cause.

Port Campbell, which is likewise in South Andaman, was next visited. It was found to be an extremely fine harbour, with excellent anchorage, but at all times difficult of exit or entrance, from the direction and extreme narrowness of the deep-water channel at its mouth. We steamed round it and landed to examine the native villages near Montgomery Island at its mouth. The inhabitants steadily declined every advance, and we avoided actual collision with them. Wood, water, building-materials, and the essentials of a settlement, were abundant.

The Expedition, still steaming northward, then proceeded through Middle Strait, which separates Middle from South Andaman, to ascertain if possible the physical features of the interior of the island. The strait, in the greater part of its extent, was bounded by deep patches of stunted mangrove, the growth of that plant being evidently checked by the quantity of fresh water that falls into the strait during the monsoons. They would, if reclaimed, form rich rice lands, after the manner adopted in the island of Ramree, by bunding out the sea—an operation of no great physical difficulty where the rise and fall of the tide never exceeds 7 feet.

On leaving Middle Strait the coast was skirted, as near as it was safe to approach, to Port Andaman, which was steamed through. A large and easily accessible harbour is formed between the eastern canal of Interview Island and the adjoining western aspect of North and Middle Andaman. We steamed round Interview Island, and at its southern extremity, near South Reef Island, came into violent collision with the natives in an attempt made to open an amicable intercourse with them: one of them was captured and carried to Calcutta; of him more will be mentioned hereafter.

Interview Island lies parallel to and at a small distance from the main land. It is everywhere surrounded by a broad belt of man-

grove, except near its southern end, where the land is higher and more healthy-looking. It is covered with dense vegetation, and appeared to have an abundance of fresh water. In all its other characters it bears a strong resemblance to the other islands on the western shore, being little elevated, and bearing evident marks of exposure to the violence of the south-west monsoon. It is more thickly peopled than most parts of the western coast, but seems to share in the general deficiency of animal life.

An attempt to penetrate the Andaman Strait from the western extremity failed, the steamer having grounded on a rock at its mouth, from which it was extricated with much difficulty.

The remainder of the west coast was not minutely examined, as it was found not to contain any of the essentials for a convict settlement.

The Great Andaman is about 125 miles long, with a breadth varying from 10 to 16 miles. Its length runs north and south in the 93rd degree of east longitude, and between the 11th and 14th parallels of north latitude. Strictly speaking, the Great Andaman is formed by three islands, distinguished as North, Middle, and South. The two latter are separated by a strait, averaging a quarter of a mile in breadth, and extending for 12 miles north-west and south-east. It has a considerable depth of water throughout; but the eastern entrance, owing to the presence of a bar, has only, at low water, a depth of $1\frac{1}{2}$ fathoms. The two former are separated by a labyrinth of narrow canals, meandering through the swamps; but there is no distinct or practicable passage, of which the existence was indicated as probable by Lieut. Blair.

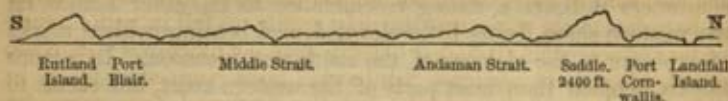
Viewing the Great Andaman as one island, a section of it from east to west would exhibit something of this form:—



The highest land, wherever seen, is on the eastern, and gradually descends towards the western shore. The water-shed is, therefore, chiefly towards the west, and consequently it is on that side of the island that marshy localities probably abound.

A section of the island from north to south shows the existence of several elevated ridges, which have all one characteristic in common: their highest point is towards the north, and they gradually decrease in height to the south, until they terminate either in low marsh-land, as at Andaman Strait, or in undulating ground of moderate elevation, as to the south of Port Cornwallis.

Rutland Island, which may be looked on as a continuation of the Great Andaman, has also its high mountain, which gradually sinks towards the south into a succession of low undulating hills.



To the north of Port Cornwallis the island is formed of a series of low hills, having the usual outline common to trap-formations. Immediately to the south from that port the land rises, until about 7 miles to the south it reaches its highest elevation in the Saddle Mountain, of which the height is about 2400 feet: it then gradually decreases for the next 14 miles, when the hills terminate, and there is some extent of land similar in character to the Sunderbunds, being low swamps covered with mangroves, and intersected by narrow canal-like passages, filled or half empty as the tide rises and falls.

A few miles farther south the land again attains a considerable elevation, which it retains for 18 miles, when it resumes a lower character; but the extent of this was not ascertained, as the coast opposite the Archipelago was not examined, for reasons mentioned above.

At the eastern entrance of Middle Strait hills are again prominent, become more so a few miles farther south, pass Port Blair, and end at Macpherson's Strait.

The geology of the island was not sufficiently investigated to warrant any detailed description. Specimens of rocks were collected at every locality at which a landing was effected, and were made over for arrangement and description to the Museum of Economic Geology in Calcutta. Extensive beds of silicious sandstone and limestone were discovered, which would prove valuable as building materials for any settlements that may be formed.

The hills are covered throughout the island, from their summits to their bases, with dense, luxuriant, and nearly impenetrable vegetation: among them were fine timber-trees and an abundance of bamboos, rattans, and thatching-palms. So far as we had the opportunities of examination, the general character of the botany of the island resembles that of Sumatra and of the Straits Settlements. The nutmeg and the pine-apple were found in a wild state. The poon, dammer, red-wood, ebony, cotton, and almond-trees were seen.*

* The nutmeg found in the wild state is not the aromatic nutmeg, but one of many species of no value. The pine-apple, a native of America, must have been introduced by the English settlers of 1790 or 1796. The cotton is not the gossypium, yielding the well-known textile material, but the silber-cotton or bombax, a tall forest-tree.

The only mammal seen by us was a small black wild hog, which has since been described by Mr. Blyth, and is believed by him to be a new species peculiar to the Andamans. Rats and monkeys are also said to exist there, but we did not meet with any of them. A harmless green snake was the only reptile we fell in with: centipedes and scorpions abounded. Birds were not numerous: pigeons, crows, kingfishers, curlews, fish-hawks, gulls were shot by us in different parts of the island; but the feathered tribe were by no means so numerous or varied as on either of the adjacent continents.

The general chart of the Andamans, prepared by Lieut. Archibald Blair, was supplied in manuscript by the Surveyor-General's office of Calcutta for the use of the Expedition. It was employed throughout, and found to be an accurate, safe, and certain guide to all those parts of the islands which had been examined by him in detail. In those spots where his survey had been less minute it was found to be defective; but wherever it proved to be so, the localities were of such a nature as to be of no practical use, either in themselves, or from being beset with dangers which render them so. But all those places which had been attentively surveyed and were represented in minute detail on the chart, such as Old and New Port Cornwallis, Rutland Island, Port Campbell, &c., were found to be in exactly the same condition as when delineated by Blair 70 years ago. This was particularly observable in Middle Strait, where islets of only 50 yards in length appear in precisely the same state as to size, elevation, and position, as that represented by the first surveyor. The very vegetation upon them gave the idea of its being the growth of the last monsoon; the only signs of age being the dead stems and decayed branches of trees standing among the low mangroves, stunted from want of the free access of the waters of the ocean.

The permanency of the features of this passage is doubtless attributable in the first place to the hard sandstone formation prevalent in its vicinity, and which forms the foundation of these islets, as well as of the points which govern the windings of the strait. Further, the tides are so weak as to carry no silt with them, and the drainage is merely that of the adjacent hills, which would amount in the aggregate to 50 square miles, and this, being distributed through the entire length of the strait, is far too small to affect it.

The whole of the shores of the Andamans are skirted by continuous coral reefs. Coral abounds in every bay, and is strewn in broken pieces on every beach. These reefs are far more extensive and form dangers to a much greater distance from the land on the west side than on the east, depths of 100 fathoms being found in many places on the eastern shore within 3 miles of the coast, and

generally at a distance of 5 miles; whereas on the western shore the reefs form dangerous patches at a distance of 20 and 25 miles from the land—a fact the probability of which is sufficiently indicated by the geological features of the islands, the general dip of the stratified rocks being to the eastward and at a high angle, sometimes as much as 75° .

We were unable to make any observations on the growth of the coral, our chart being on too small a scale, and the chief objects of the Expedition not permitting of our devoting any special time and attention to it. Navigation among coral must at all times be hazardous, and the most minute survey may fail to detail some of the isolated rocks, of the approach to which no warning is discoverable. The banks which exist so far to the westward must always prove impediments to the prosperity of a colony established at Interview Island, or on any part of the western coast.

All accounts concur in representing the inhabitants of the Andaman Islands as extremely savage, uncivilized, hostile to strangers, inhospitable, and steeped in the lowest depths of barbarism. From the time in which the first mention of their existence is found to the present moment they have consistently maintained the same character. All our attempts to hold amicable intercourse with them failed utterly, and in most instances ended in hostile collision, the initiative being invariably on their part—on ours hostility was strictly confined to self-defence and the repulsion of their unprovoked attacks. It is impossible to imagine any human beings to be lower in the scale of civilization than are the Andaman savages. Entirely destitute of clothing, utterly ignorant of agriculture, living in the rudest and most simple habitations, their only care seems to be the supply of their daily food. The little that is known of their manners and customs proves them to be without religion or government, and that they live in perpetual dread of the contact of any other race. Of the large number of convicts who have escaped from the new settlement, in the hope of finding an asylum with the savages, with a very few exceptions, all who survived hunger and exposure were murdered by the aborigines with the most determined ferocity. The few who were spared and have returned to the settlement have been unable to assign any reason for their own safety.

From time immemorial they have been reputed to be cannibals. We examined every hut and village visited by us for proofs of the existence of such a practice in vain. The question may now be considered to have been set at rest by the testimony of a Brahmin sepoy of the 14th Bengal Native Infantry, named Doodnath Fewarny. This individual was a convict mutineer, who escaped from Port Blair on the 23rd of April, 1858, and returned voluntarily to the settlement on the 17th of May, 1859, after a residence

of a year and 24 days among the aborigines of the Great Andaman. In his deposition, taken by Dr. J. P. Walker, the first superintendent of Port Blair, he distinctly stated that "the aborigines are undoubtedly an uncivilized people, but they most certainly are not cannibals in any way, for they neither devour human bodies in any form, nor do they eat uncooked animal food in any form. They are a wild people, most savagely inclined to strangers generally, but most kindly disposed in their conduct to each other."

Of their social habits all that was previously known was conjectural, and was so mixed up with fable and fiction as to be undeserving of belief. Doodnath Fewarny, and another convict who likewise lived for some time among them, have communicated important, and in the main probably correct, information regarding these and many other particulars respecting this singular race. Much of what follows is on the authority of the individuals above mentioned.

The Great Andaman is apparently inhabited by a single tribe speaking the same language, having the same manners and customs, and possessing a similar identity of physical characters. The entire population is migratory, rarely residing in one spot for many days. They are divided into groups or parties of from 10 to 300 each, generally, however, not exceeding from 30 to 50, including all ages and both sexes: their number has heretofore been estimated at from 3000 to 10,000. The Brahmin sepoy believes that, in the finest part of the island which had been visited by him, he must have seen at least 15,000 men, women, and children on the southern and western coasts: there is an encampment every 4 or 5 miles. The proportion of children to adults and of males to females is stated by the same observer to be about the same as in Hindustan. He saw no indications of the practice of infanticide; children of all ages were alike treated with kindness and care. The rate of mortality, judging from that of Hindustan, was not high. The births were believed to exceed the deaths, and the population to be, consequently, on the increase. They generally inhabit the jungle adjoining the seacoast, from the facilities which there exist for procuring an abundant supply of shell and other fish, and of fresh water. Villages are also formed on the shores of tidal creeks; but in the interior itself no clearings or habitations exist. Parties visit the interior to hunt pigs and collect fruits, but return to the coast at sunset, except when travelling from one place to another. Their habitations are open huts, composed of roofs thatched with palm-leaves, raised on four posts, of which those in front are usually higher than those in the rear. In every large village or encampment was one hut in the centre, built and thatched with considerable care and skill, square in form, and containing a large

number of pig and turtle skulls, bows, arrows, shields, and domestic articles. The floors of the huts are free from vegetation, and the ground in and immediately adjoining the villages is also carefully cleared of all jungle. The foot-paths, every one of which was carefully traced, were found to lead to rills of fresh water: in no instance did they lead to more extended inland means of communication. The group of huts varied from 3 or 4 to as many as 22 in number. In the interior of the huts were found bundles of pig and turtle skulls, and sometimes a considerable collection of fish-bones.

They have no idea of a Supreme Being, and perform no ceremonies to indicate the existence of any form of religion. The account of their religious ceremonies given by Colonel Syme is not confirmed by any of the persons who have dwelt among them.

The girls attain the age of puberty between 12 and 14 years, subsequent to which the intercourse of the sexes is of the nature related by Herodotus in regard to the Massagetæ. The wives are said to be faithful to their husbands, and the widows do not re-marry, remaining virtuous—being the only exceptions to the utter absence of all moral feeling among them.

Their marriage ceremony would appear to be of the most simple nature. The seniors of the parties determined the matter without consulting those more immediately concerned, who were sent for and married, without exciting attention or curiosity. In five weddings witnessed by Doodnath Fewarny the proceeding was the same. The bride, having painted her body in stripes and covered her fingers with red earth moistened with turtle-oil, sits on leaves spread on the ground as a carpet; the bridegroom, similarly decorated, squats on his leafy bed at a distance of 10 or 12 paces. They thus sit in silence for about an hour, after which the person who is to unite them comes from his hut, takes the bridegroom by the hand, leads him to the bride, and having seated him, without saying a single word, presents him with five or six iron-headed arrows, and then leaves him. They remain in silence by each other until nightfall; and this is all the ceremonial observed.

The women rarely accompany the men in their hunting or fishing excursions—the supply of water, cooking of food, making of nets and baskets, and care of the children, with similar household occupations, falling to their lot. They remove the hair from the heads and bodies of the men and of one another by means of small chips of brittle glass, prepared with considerable skill and ingenuity: they also tattoo the bodies of both sexes by small incisions in regular lines, the whole body being thus marked, with the exception of the head, neck, lower part of the abdomen, and hands and feet. The operation is performed between the ages of eight and ten, and during the first four months of the year, when fruit is abundant

and fishing less frequent. A limb or part of a limb is tattooed in a month, the entire completion of the operation occupying from two to three years, at the season above mentioned. As soon as the incisions are completed, the bleeding limb is smeared over with a white earth, supposed to be lime. The wounds, after free suppuration, heal in two or three weeks, no colouring matter being used to render the marks more indelible. The little of medicine or surgery practised by them is also performed by the women: it seems to be confined to local blood-letting by scarification, and to the application of a paste of red earth and turtle-oil.

On the march the women carry the young children in a sling made of bark, suspended from the neck, with the legs of the children passing over the loins and hips of the mother. They also carry the empty water-vessels—hollow bamboos with the septa removed—with spare or uncooked provisions, pluck the green leaves that form their bedding, and build as well as thatch any huts that may be needed.

The process of parturition takes place in public, the pregnant woman usually attending to her ordinary avocations until labour begins. The umbilical cord is cut with a knife, but no ligature is applied to it. The woman after confinement receives no special treatment, eating and drinking as usual, and moving about a few hours after delivery. The child on being born is immediately washed in cold fresh water, poured from a bamboo, and its body is dried by the hand heated before a fire, quickly and repeatedly, but very gently, applied. Any mother who is nursing at the time suckles the new-born infant until its own mother is able to do so; the child is only weaned when the maternal supply of food ceases. During the first days of its existence the infant is covered with a few leaves sewn together: this covering is called "kassa."

Children are kindly treated by their parents, who are respected and obeyed by them as in more advanced states of civilization. They play among themselves, as in Hindustan; the boys at three years of age being furnished with miniature bows and arrows: at eight the latter accompany their fathers in hunting and fishing.

Doodnath Fewarny has also, for the first time, made us acquainted with the manner of disposing of the dead, adopted by the natives of the Andamans. As soon as death occurs, the corpse is removed from the interior of the hut to the outside, where it remains until burial, a few hours afterwards. If the death takes place at even-tide, it is buried on the following morning—the other members of the family sleeping by the deceased, as if nothing unusual had happened. The dead seem to be sincerely mourned by their surviving relatives. The corpse is buried without any special preparation by washing, shaving, or painting: it is tied into as small a bundle as it can be made to occupy by flexing the limbs on the

trunk—a process of some difficulty when sepulture is deferred until cadaveric rigidity has supervened. It is carried to the grave by a near relative of the deceased and placed in an irregular round hole, about 3 feet in depth, over which a small mound of earth is raised to mark the spot. The whole village turns out to see the body removed, but only two or three accompany it to the burial-place, which is usually a mile inland.

Two or three months after sepulture, when the flesh has been decomposed and destroyed, some of the near relatives of the deceased dig up the bones, tie them together, and carry them to the neighbouring village: there they are spread out for the inspection of the relatives, who weep over them, each pressing a bone to the breast with one hand, while the weeping eyes are shaded by the other. The nearest of kin, male or female, takes possession of the skull and lower jaw, which is for months, probably for years, worn on the back, suspended by a loose cord from the neck. The practice is so general, that from 8 to 10 per cent. of the adult population wear skulls thus suspended when unemployed: when hunting or fishing, the men leave them in charge of the women at the encampment. The other bones are taken away by the relatives, but their ultimate disposal is as yet unknown. In our frequent examinations of huts and villages we failed to find a single human bone, or to discover any of the burial-places mentioned by Doodnath Fewarny.

From the intense blackness of their skins and their low stature, the inhabitants of the Andamans have heretofore been ranked by ethnologists as negrilloes, or negritoës, to possess a near relation to the Papuan tribes, and to exhibit more of the attributes of an African than of an Asiatic race. From a paper read by Professor Owen, at the recent meeting of the British Association at Manchester, this would seem to be an error. A careful examination of the bones of an adult male, which I placed in his hands, and for which I was myself indebted to Dr. J. P. Walker, led the eminent comparative anatomist above mentioned to regard them as an aboriginal race, with marked differences from the African and Asiatic types—the blackness of their tegumentary pigment being assigned to constant exposure. They were said to differ still more from the Papuan Australian type than from the West-coast negro, and to afford no indications of a Malagan or Mongolian origin. Their supposed affinity, from the structure of their language, to the Burmese of the opposite continent, was likewise shown to be fallacious.

The individual captured by us at Interview Island, and carried to Calcutta, was a full-grown well-formed adult, whose age we conjectured to be about 25 years: he was 4 feet 9½ inches in height. The skeleton examined by Professor Owen was that of an

adult male, 5 feet 10 inches in height, who was shot in one of the attacks made by the natives on the convict settlement. The other natives killed in our involuntary encounters were about 5 feet in height, well-shaped, robust and healthy. None of their bodies were removed by us, lest the aborigines should misunderstand the object of our mission, it having been deemed desirable in the interests of the future settlements to conciliate them by every possible means.

The natives of the Andamans, although diminutive in stature, are extremely robust and vigorous—run, climb, and swim with great swiftness and power, possess unusually acute senses, and are a brave, warlike race. Although hostile to outsiders, they are gentle and amiable in their intercourse with each other. They possess high imitative faculties, and when once captured are singularly free from all trace of ferocity. This was the case in the example referred to above, and has been noticed in regard to those who have been taken more recently, and are now at Moulemein, to be trained and educated to become, if possible, the future medium of communication with their fellow-countrymen. Both sexes and all ages are completely naked, without the smallest sense of shame. They remove the hair from the whole body, leaving only the eyelashes untouched. The hair of the man taken to Calcutta was allowed to grow, and, so far as the observation extended, exactly resembled that of the Papuan race.

The men cover the whole body with a coating of mud or clay to protect them from the attacks of insects, which are numerous and troublesome: they also rub a red earth on the top of the head, probably for the purpose of ornamentation. They wear around the waist a cord of tough vegetable fibre, to which a sharp knife-blade, made by hammering out a large nail, is attached. The use of this seems to be to open shell-fish.

Their weapons are bows and arrows—the former extremely tough and of various shapes; the latter usually 4 feet in length, and either barbed with iron or with hardened wooden points. Many of them consist of two parts, united by a twisted cord, and are evidently used for fishing. None of the arrows found by us, or by which any of our party were wounded, were poisoned. One of our wounded suffered from tetanus, the result of the laceration among the deep muscles of the back. The most serious wound was that sustained by Lieut. Heathcote; but it was followed by no other bad effect than that of the injury itself. A few of the aborigines were armed with spears with light metallic heads; but none of them were obtained.

Their canoes are formed from the trunks of trees, carefully selected and seasoned, and scooped out by means of an adze, con-

sisting of a wooden handle with a sharpened metal blade. In Blair's time they are stated to have been excavated by the agency of fire. Some of them had strong outriggers for open sea navigation, and occasionally lights were seen 3 or 4 miles from the coast at night, which were conjectured to have been given out by the resinous torches, which were found in every canoe.

Hand-nets, and large nets with stone weights, were found in nearly every village, and in most of the canoes. The former were extremely well made; the latter were strong, and apparently designed for the capture of turtle.

Their drinking vessels were either the shell of the nautilus or joints of the bamboo. Some of the latter are stated by Doodnath Fewarny to have been several feet in length, with the inner partitions removed, and to be capable of containing five or six gallons of water.

All that is yet known of their language is contained in the brief vocabulary published by Colebrooke. It possesses no analogy to any known living tongue, and was not understood by the savage taken to Calcutta. This individual sickened so suddenly and unexpectedly, that no vocabulary could be obtained from him. The opportunity now afforded, by the detention of three other members of the same race at Moulméin, of obtaining a more perfect record than has heretofore been possible, will doubtless not be lost sight of.

The Andamans are now the penal settlement for all convicts transported from India, and very recently they have been opened to colonization, under certain restrictions. The entire absence of free labour, the extreme difficulty of clearing away the primeval forest, and the aggressive character of the aborigines, will prevent the latter privilege from being taken advantage of for some time to come. Yet the extreme fertility of the soil, the mild quality of the climate, and the advantageous position of the islands, will in time render them as valuable as some of the Straits settlements are at present.

At all events, the standing reproach of so great a scandal to humanity in the track of the commerce of one of the greatest and most frequented highways of the world has been permanently removed, and the reclaiming of its wretched population from their present misery and degradation is brought within the reach of the Christian and the philanthropist.

XI.—*On the Trade of the Eastern Archipelago with New Guinea and its Islands.* By ALFRED R. WALLACE, Esq., F.R.G.S., &c.

Read, January 13, 1862.

THE portion of New Guinea with which trade is regularly maintained from the Eastern Archipelago extends from the eastern extremity of the great Geelvink Bay on the north coast in about long. 137° E. to very nearly the same longitude on the south coast, a little beyond the river Utanata. Besides this coast-line of more than 1200 miles it embraces also the large island of Jobie and the smaller ones of Biak and Sook to the north of it, the islands of Waigiou, Batantá, Salwatty, and Mysol at the north-western extremity, and the islands of Ké and Áru in the southern portion. These islands are all inhabited by portions of the same great Papuan race, and are (with the single exception of the Ké Islands) geographically and zoologically a portion of New Guinea.

The only articles of commercial value procured from the interior of New Guinea are Mussoi bark and wild nutmegs. From the coasts and islands tripang or bêche-de-mer, mother-of-pearl shell, and tortoise-shell are all produced in abundance; and as they are all articles which command a ready sale, and at high prices, the trade is a very important one. The articles of less importance are pearls, birds of Paradise, sago (raw and in cakes), mats, palm-leaf boxes, and rice in the husk, or paddy.

The destination of these articles is various, and but few reach Europe. The Mussoi bark, which contains an aromatic oil of a rather pungent odour, is sent to Java, where the natives buy it at a high price to rub on the skin as a remedy for rheumatic and many other diseases. It is probably from a tree of the cinnamon family. The tripang or sea-slug is all bought up by the Chinese, who are the only consumers of this repulsive article. The tortoise-shell is mostly bought by the Manilla traders, and I presume much of it is manufactured in the Philippines into combs and ornaments. Finely-spotted shells with much white in them are very highly esteemed, and command high prices. These the richer natives often keep in their houses as ornaments, and as articles always convertible into cash. Some tons of tortoise-shell must be produced annually on the coasts of New Guinea, and, as it is worth here 12s. to 20s. per pound, it becomes of itself an important trade. The pearl-shell and the wild nutmegs go all to European markets. Of the less important articles, the birds of Paradise are dispersed over the world; the greater part, I believe, now go to China. The pearls—which are few, and seldom fine—are also mostly bought by the Chinese. The sago and rice being very local productions, and the former being the staple food of the

surrounding districts, they are a great medium of exchange over all the Papuan countries, a little being also taken to Ternate. The mats and palm-leaf boxes are in great demand all over the Moluccas.

The goods with which these various products are purchased are not very diversified, the principal being bar-iron, calico, and thin red cottons from England, choppers made in Singapore or Macassar, Bugis cloths, cheap German knives and Chinese plates and basins, brass-wire, white and coloured beads, and silver coins. Arrack is indispensable in some districts, opium in others; but these are not in such general demand as the preceding.

The trade is mainly carried on in native prahuws, a few small schooners only being now engaged in it from Ternate, Menado, Amboyna, and Macassar. They, however, form quite an unimportant feature in the trade of New Guinea, which is essentially native.

A Malay prahuw is a vessel so unique as to deserve a brief description. It is a short vessel with bow and stern nearly alike. The deck (when it has one) slopes down towards the bows. The mast is a triangle, and consequently wants no shrouds, and, being low, carries an immense yard much longer than the vessel itself, which is hung out of the centre, and the short end hauled down on deck, so that the immense mainsail slopes upwards to a considerable height. A full-rigged prahuw carries a smaller similar sail abaft, and a bowsprit and jib. It has two rudders, one on each quarter, with a window or opening on each side for the tillers considerably below the deck. These vessels can only sail 8 points from the wind (so that it is impossible to make any way by tacking when the wind is ahead), and make their voyages only with the favourable monsoon—accomplishing, therefore, generally but one voyage a year. They are of all sizes, from 1 to 100 tons' burden, and are built—some with regularly nailed planks, some fastened only with rattans—but so ingeniously and securely as very well to stand a sea-voyage. When I first went from Macassar to New Guinea, a distance of 1000 miles, a small prahuw of about 10 tons which had not a single nail in its whole structure kept company with us all the way. The largest prahuws are from Macassar and the Bugis countries of Celebes and the island of Boutong. Smaller ones in great numbers sail from Ternate, Pidore, East Ceram, and Goram, which I shall have occasion again to allude to.

I will now give a short notice of the chief districts of New Guinea and its islands, with the most important particulars relating to the trade carried on there, and the condition and character of the inhabitants.

Great Geelvink Bay.—The centres of trade for this district are

Dorey and the little island of Roen. The inhabitants of the mainland and of the island of Jobie are very ferocious. At Jobie vessels at anchor have been attacked, and sailors on shore have been frequently murdered. A schooner from Ternate comes every year to Roen and the district of Wandamen, at the head of the bay, to load Mussoi bark, which is found here only. One or two prahuws from Ternate also go along the coast of Jobie and round the bay, buying tortoise-shell and tripang. The natives of Dorey, in small boats, visit Mafor, Sook, and Biak, and the west end of Jobie, buying tortoise-shell, birds of Paradise, and crown-pigeons, which they sell to the traders who touch at Dorey. The inhabitants of Dorey, Roen, and some of the other coast villages have a little sprinkling of Malay blood, are beginning to use clothing, and thus make the first step in civilization. Jobie is celebrated for its birds of Paradise, the only product of its interior. Dorey produces rice, which the natives take to Salwatty and exchange for sago. The Dorey people also go to Amberbaki, 100 miles westward, to buy vegetables and birds of Paradise, for which that village is celebrated.

Salwatty and Waigioú.—Salwatty is a great sago country, supplying all the neighbouring districts with this necessary of life. It is the centre of the trade of the western extremity of New Guinea, a Bugis trader having an establishment in the chief village of Semeter, and most of the trading prahuws and schooners touching there. Tortoise-shells, pearl-shell, and tripang are produced in great abundance on the shoals and islands round about, and the coast of New Guinea to the eastward produces the greatest number and variety of birds of Paradise.

Waigioú possesses but few inhabitants, and no true indigenes. It is remarkable for its deep inlets and narrow, rocky channels, but imperfectly represented on the charts. The village of Waigioú is situated at the head of the deepest inlet, and, being the only part of the island producing sago, is much resorted to. Pearl-shell is also found there.

The productions of Waigioú are taken either to Salwatty or to Tidore, few trading prahuws visiting it. The inhabitants of all this part of New Guinea may be divided into two classes: the coast people, who have more or less mixture of Malay blood, are mostly nominal Mahometans, build their houses on stakes in the water, and occupy themselves almost entirely with fishing; and, secondly, the inland people, commonly known as Alfurus, who are of more pure Papuan blood, live on the mountains, cultivate vegetables, and catch birds of Paradise. They are considered as inferiors, and almost as slaves, by the coast people, and have in almost every district a distinct language, while the coast people from Dorey and the islands of the Great Geelvink Bay to Salwatty,

Waigioú, and Mysól, all speak the same language—or so nearly the same that they can understand one another. In their villages one always finds some people who can speak Malay, which is generally quite unknown to the Alfurus. The inhabitants of Waigioú have slaves who cultivate their vegetable grounds, but they have been originally brought from the mainland of New Guinea, and are not true indigenes. They now speak the same language as the coast people.

The districts south-east of Salwátty and the coasts of McLuer Inlet produce abundance of wild nutmegs, and a schooner comes annually from Ternate, and generally obtains a full cargo of them. The natives of this part are dangerous.

Mysól or Misool.—This island produces a great deal of sago and Mussoi bark, and abundance of tripang, with tortoise-shell, pearls, and birds of Paradise. A number of Goram and Ceram prahuws visit it annually to load sago, which they take to Ternate. The largest village is Lilinta, on the south coast, in the chief sago district. The inhabitants of the coast are Mahometans, governed by native rajahs, and speaking the common North Papuan language. In the interior are true indigenes, having a very distinct language.

This island is mountainous, but not very lofty. The rocks are sandstones and limestones. One of the latter much resembles hard chalk, and contains flints and belemnites. If geologically contemporaneous with the Cretaceous formation, it is the only instance I am acquainted with of true secondary strata occurring in the Moluccas or New Guinea. I have before only met with highly crystalline rocks, volcanic, coralline, or alluvial formations.

Coast South of McLuer Inlet.—The peninsula south of McLuer Inlet is known to the native traders by the name of Papua Onen. The people of Goram chiefly trade there; but the natives are very treacherous, and, when not satisfied with the barter offered them, will frequently attack and murder the traders. On the coast are a few villages of Mahometans, who are also subject to constant attacks of the indigenes of the interior. The productions are wild nutmegs and Mussoi bark, in small quantities, with the usual tortoise-shell and tripang on the coasts.

Farther south from Adie Island to Utanáta is the Papua Kowiyei of the traders. The Goram and Bugis traders have almost the monopoly of this district, which produces much Mussoi bark, with the other usual products, and is celebrated for the number of lories, cockatoos, and other birds procured there. Even these are not of trifling value, as every prahuw returning from any part of New Guinea is sure to bring some dozens or scores of them, and they all sell readily in the ports of the Moluccas at from 2*s.* to 10*s.* each, or even more. Many hundreds—I might perhaps say thou-

sands—are brought from the Papuan countries every season, yet the supply seems never equal to the demand. The natives of many parts of this coast are also very dangerous.

While I was at Goram (in May, 1860), the crews of two prahuws, including the Rajah's son, were attacked in this part of New Guinea, in open day, while bargaining for some tripang, and all murdered except three or four, who escaped in a small boat and brought the news. The shrieks and lamentation in the village when the news was brought were most distressing, almost every house having lost a relation or a slave.

Farther east than Uta, as well as the eastern parts of the Geelvink Bay, go by the name of Papua Talanjong, or "Naked Papua," because the natives are absolutely without clothing, or any apology for it. These parts, however, are seldom visited.

The Aru Islands.—Of all parts of the New Guinea district, the Aru Islands are the most productive. Ten or twelve of the largest-sized Macassar and Bugis prahuws go there annually, and generally get a full cargo of pearl-shell, tripang, and tortoise-shell. Besides these, scores of smaller boats flock there from Goram, East Ceram, Banda, and Amboyna; while the natives of Ké, of Temimber, of Babber, and of some parts of New Guinea, come there as to a fair to dispose of their products, or to fish for the supply of the traders.

The village of Dobbo, on one of the western islands, is the centre of the trade, where the large prahuws are hauled up and repaired, smaller ones being sent among the islands to collect produce. The village is situated on a narrow spit of sand, on which are crowded three streets of rude thatched houses, while a larger population live in their boats or under mats on the beach. In the height of the season I calculated that Dobbo contained 1000 inhabitants—some from almost every chief island in the Archipelago. Chinamen from Macassar opened stores, tempting the motley population with gaudy china, glass, and trinkets. Even the European luxuries of sugar, biscuit, preserved fruits, and wine, were to be obtained in small quantities, but at very moderate prices, and there was generally no advance made on the Singapore or Macassar rates, the dealers trusting to the profit obtained on the produce taken in exchange from the native buyers. Cockfighting and football-playing (in which the Bugis are very expert) took place almost every evening in the widest part of the street; and though quarrels sometimes occur and creeses are drawn and used, yet, considering there is no government, and the mixture of races and religions crowded together, all eager for gain, order and harmony generally prevail. This is in part due, however, to a Dutch official, who makes an annual visit for a few days to hear and decide disputes and punish offences.

Aru is one of the places in which arrack is indispensable to

purchase produce. A native who has accumulated a good lot of tripang or pearl-shell, besides the cloth, crockery, and ironware, will always have one or two cases of arrack (of about 7 gallons each) in payment. He then calls together his particular friends and has a grand drinking bout, which continues day and night till the whole is finished. During these orgies they frequently break or burn half their scanty moveables, or even pull their own house down about their ears, of course fighting occasionally; but, as the women remove all weapons, lives are seldom lost.

The natives with whom I resided in the interior boasted of these exploits, saying they did not do things by halves, and that they would rather have no arrack at all than not enough to get thoroughly well drunk while they were about it.

Owing to the great competition in Aru, articles are sold very cheap, and a high price given for all native produce. It thus happens that these remote and savage islanders obtain calicoes, handkerchiefs, and other articles, which are to them more ornament than clothing, at a far cheaper rate (estimated in labour) than the inhabitants of the towns where they are made, or the workmen who produce them. This is one of the anomalous results of that immense commercial and manufacturing system of which we are so proud, and whose continual increase we look upon as an unmixed blessing to mankind.

The trade of Aru is perhaps more considerable than that of any other part of the Papuan district. In the year 1857, when I visited the islands, there were 15 large prahuws from Macassar, and more than 100 small ones, of various sizes, from Ceram, Goram, and the Ké Islands. The Macassar cargoes were worth about 200,000 rupees (15,000*l.*), and the small boats about 50,000 rupees more. The great bulk of this consists of pearl-shell and tripang, all other articles of produce being in much smaller quantities. The Goram and Ceram men bring cargoes of sago-cakes, which the natives of Aru eagerly buy; and there are many natives of the island of Babber who devote themselves to fishing, while the inhabitants of the interior bring large quantities of sugar-cane, plantains, and other vegetables. Dobbo, therefore, is well supplied with provisions, and is on that account a much more agreeable residence than any other part of the Papuan district, where provisions are very scarce, and the obtaining anything to eat is a daily-recurring problem.

Several of the villages of Aru are Christian, and have native schoolmasters from Amboyna: others are Mahometan; while the natives of the interior have nothing that can be called a religion. As is generally the case in the far east, the latter are the most industrious of the three, and are therefore the least miserable, and by far the most pleasant to reside with.

Ké Islands.—The natives of Ké are the boat-builders of the far east. Several villages are constantly employed in this work, in which they are unequalled in the Archipelago. Their forests produce excellent timber of many different kinds; and the workmen are so expert in the use of the axe and adze, that with these alone they produce vessels of admirable form and most excellent workmanship. In a good Ké prahuw the model is perfect; the planks are as smooth as if planed, and fit together so exactly that from end to end a knife cannot be inserted between them. The planks are all cut out of the solid wood, with a series of projections left on the inside, to which the inner timbers are attached by rattans. The planks are all pegged together along the edges with pins of hard wood, so that it is impossible they can spring. After the first year the rattan-tied ribs are generally replaced by new ones, fitted to the planks and nailed, and the vessel then becomes fully equal to those of the best European workmanship. The Papuan traders and the natives of Goram and Ceram all buy their prahuws and small boats at Ké, and lately several fine schooners have been built there. Very excellent ship-building timber may be purchased here at cheap rates—muskets, gongs, and cotton cloths being the principal articles taken in exchange: good carpenters' tools are also much appreciated. Besides boats and timber, cocoa-nut oil is the chief export of the Ké Islands. The original inhabitants of Banda have emigrated to Ké since the Dutch took possession of that island, and they now inhabit separate villages, having preserved their language, and are known as Ké Banda people.

Between Ké and Ceram are a range of islands, inhabited by natives of Papuan race, but becoming lighter in colour as we approach Ceram. About midway is Teor, a small hilly island inhabited by a fine race of brown-skinned frizzly-haired people, who cultivate vegetables and seek tortoiseshell, which they bring in their little open boats to Goram and Ceram. The Matabello Islands are raised coral reefs, 300 to 400 feet high, covered with fruit-trees and cocoa-nuts, from which the natives manufacture oil, which is the principal article of trade. They are wealthy, the women all wearing massive gold earrings, and the chiefs dressing on state occasions in flowered satin gowns and scarfs. In their villages, too, are dozens of small brass guns, which must have cost a great deal of money; yet their houses are most miserable and filthy, and their food most precarious and scanty. Cocoa-nuts and oil-refuse, with an occasional sago-cake, form their principal subsistence, and cutaneous diseases, as the necessary result, everywhere abound.

A little farther to the north-west is the Goram group, consisting of three islands, and very thickly inhabited by a race allied to the Ceram Malays. They are the great traders of the far east, visiting all the coasts and islands of New Guinea, and selling the product

of their voyages to the Bugis and Chinese traders, who have their general "rendezvous" at Kilwaru, in the Ceram Laut Islands. In their voyages they are most enterprising; in other respects very inactive and lazy, depending for food almost entirely on the labours of their Papuan slaves. Many of the inhabitants are much addicted to opium-smoking. The only manufactures of Goram are coarse mat sail-cloth, a little cotton, and ornamental boxes made of sago-pith and pandanus-leaves, which are much esteemed all over the Moluccas as clothes-boxes. The Goram men visit Banda, Amboyna, and Ternate; but seldom extend their voyages farther, as the Bugis traders give them a good price for their tripang and tortoise-shell.

The great "rendezvous" for the New Guinea traders is Kilwaru, a little island scarcely 50 yards across, situated between Ceram-laut and Keffing. On both sides of it is a good anchorage in all weathers, which is probably the reason why it has been chosen. Though scarcely raised above high-water mark, and with not two acres of surface, it possesses wells of very good drinking water—a fact which I could hardly have believed had I not examined it myself. When I visited Kilwaru there were a native schooner from Baly, and several Chinese and Bugis prahuws from Macassar, in the harbour; and there were stores open on shore, in which almost every article requisite for New Guinea trade could be procured. Sugar, tea, coffee, rice, arrack, and wine were also to be purchased here, and a large assortment of cotton-cloths, both of European and native manufacture, as well as muskets, gunpowder, china, crockery, German knives, opium, and tobacco.

Sago being so intimately connected with the trade of New Guinea, and forming the staff of life for so large a portion of the natives engaged in it, a short account of its growth and manufacture may be appropriately given.

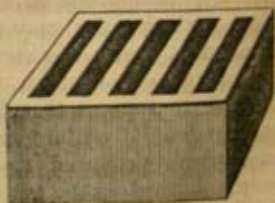
The sago-tree is a palm, thicker than the cocoa-nut-tree, but not so tall, with immense spiny leaves, which completely cover the stem till it has arrived at a considerable age, when the lower ones rot and fall off, leaving the bare stem. It has a creeping root, or rhizoma, like the Nipa palm, and bears an immense terminal spike of flowers at about ten or fifteen years of age, after which the tree dies, being thus allied to our annual and biennial plants, and to the aloe. It grows in swamps or in swampy hollows on the rocky slopes of hills, where it appears to thrive equally well as when exposed to the daily influence of salt or brackish water.

The midribs of the leaves form one of the most useful products of these lands, supplying the place of bamboo, to which, for many purposes, they are superior. These midribs are 12 or 15 feet long, and often as thick as one's leg at the base. They are very light, consisting entirely of a firm pith, covered with a hard brown

skin. Entire houses are built with them. They form admirable roofing poles for thatch; split and well supported, they make flooring; and when chosen of equal size and pegged together, they form excellent walls and partitions to framed wooden houses; carefully split and shaved smooth, they are formed into boards, with pegs cut out of the hard skin, and are the foundation of the leaf-covered boxes of Goram and New Guinea. All the insect-boxes I have used in the Moluccas are thus made in Amboyna; and when covered with paper inside and out are quite strong enough, exceedingly light, and carry insect pins remarkably well. The leaflets of the sago folded and tied side by side on the smaller midribs, or to strips of bamboo, form the "attap," or thatch, in universal use; while the product of the stem is the daily food of some hundred thousands of men.

When sago is to be made, a full-grown tree is cut down and cleared of leaves, and a broad strip of bark on the upper side is taken off, exposing the pith, which is of a rusty colour near the base, but pure white higher up, as firm as a dry potato, but with woody fibres running through the substance and branching in every direction, about a quarter of an inch apart. The pith is beaten into powder by means of a hard and heavy piece of wood, with a bit of quartz or flint fixed into the end. At each blow this cuts away a narrow strip of pith, which falls down into the hollow cylinder formed by the trunk, and is packed into baskets, made of the sheathing bases of the leaves. It is then carried to the nearest water, when a washing-machine is constructed, composed entirely of the tree itself, with strainers of the cloth-like sheaths of the cocoa-nut leaves. Successive washings dissolve and carry away all the starchy matter, which settles in large hollows formed in the water-troughs. This is packed cylindrically in sago-leaves, and is the raw sago of commerce.

Raw sago, simply boiled with a little water, forms a thick starchy mass, called "papéda," eaten with chop-sticks, in the Chinese fashion. More commonly, however, it is baked into cakes, in small clay ovens, containing six or eight vertical slits, side by side, about three-quarters of an inch wide, and forming cakes six or eight inches square. This is thoroughly heated over a clear fire, and the sago, first dried, powdered, and finely sifted, is filled into it. It is covered with a piece of flat sago-bark for a few minutes, and the cakes are baked. The hot cakes, with the addition of a little sugar or grated cocoa-nut, are very agreeable, something resembling maize-bread. When required to be kept, however, they are dried for



several days in the sun, and tied in bundles, of 20 to 50 each, when they can be kept for years. When thus dried they are very hard, and taste rough, like sawdust-bread; but the people are used to them from infancy, and little children may be seen gnawing them as contentedly as our own with their bread and butter.

It is truly an extraordinary sight to see a whole tree-trunk, perhaps 20 feet long, and 5 in circumference, converted into food, and with no more preparation or labour than is required to make flour from wheat or maize. A good-sized tree will produce 30 tomans, or bundles of 30 lbs. each; and these when baked will give 60 cakes, of 3 to the pound. Two of these cakes are a meal for a man, or about 5 a day; so that, reckoning a tree to produce 1800 cakes, weighing 600 lbs., it is food for one man for a year. The labour to produce this is as follows:—Two men working moderately will finish a tree in five days, and two women will bake the whole in about five days more; but the raw sago can be kept any time, and baked as wanted, so that we may estimate that in ten days a man may produce food for the whole year. This is, however, if he possesses trees of his own, for all are now private property, and poor men have to buy a tree for 5 or 6 rupees (about 9s.). The ordinary price of labour here is 25 doits, or 4d., a day; so that the total cost of 1800 cakes, or a year's food for one man, is about 12s.

This excessive cheapness of food is, contrary to what might be expected, a curse rather than a blessing. It leads to great laziness and the extreme of misery. The habit of industry not being acquired by stern necessity, all labour is distasteful, and the sago-eaters have, as a general rule, the most miserable of huts and the scantiest of clothing. In the western islands of the Archipelago, where rice is the common food of the people, and where some kind of regular labour is necessary for its cultivation, there is an immediate advance in comfort, and a step upward in civilization. This limited observation may be extended with the same results over the whole world; for it is certainly a singular fact that no civilized nation has arisen within the tropics. That rigour of nature which some may have thought a defect of our northern climes has, under this view, been one of the acting causes in the production of our high civilization. We may, indeed, further venture to suppose that, had the earth everywhere presented the same perennial verdure that exists in the equatorial regions, and everywhere produced spontaneously sufficient for the supply of men's physical wants, the human race might have remained for a far longer period in that low state of civilization in which we still find the inhabitants of the fertile islands of the Moluccas and New Guinea.

These scanty notes on the commerce of a very remote and little-

known region have been collected during three voyages to various parts of New Guinea and its islands. They are offered to the Royal Geographical Society in the belief that no authentic and connected information on the subject has yet been published, and with the hope that their crudeness and deficiencies will be pardoned.

XII.—*Report on the Brazilian Province of the Paraná.* By the Hon. H. P. VEREKER, H.M. Consul at Rio Grande do Sul.

[Communicated by the FOREIGN OFFICE.]

Read, February 24, 1862.

THIS province was formerly the fifth comarca or county of the province of St. Paul, in territorial extent comprising nearly half of that province, but thinly peopled and much neglected. By the Brazilian Law No. 704, of the 29th August, 1853, this division of St. Paul was formed into a separate province, under the name of the Province of the Paraná.

Boundaries.—The Province of the Paraná is situated between 22° and 28° of south lat. Its limits are not yet clearly determined, but it may be stated generally that it is bounded on the south by the province of Rio Grande do Sul; on the south-east by that of St. Catherine; on the east by the Atlantic Ocean; on the north by the province of St. Paul; on the west by the province of Matto Grosso and the republic of Paraguay; and on the south-west by Corrientes, a portion of the United Provinces of the River Plate. The defined boundaries are those of the river Paraná on the west, the river Paranapanema to the north, the ocean on the east, and the river Uruguay to the south. Other portions of the limits are determined, but with regard to almost all the remainder there exist unsettled questions: even the limit with Rio Grande is disputed by the province of St. Catherine, which claims the land lying between the river Yguassú and Uruguay.

Divisions.—For judicial and ecclesiastical purposes the province is divided into four comarcas or counties, viz., Curityba, Paranaguá, Castro, and Guarapuava.

Towns.—The chief towns are Curityba, the capital, situated in a central locality; Paranaguá, Antonina, Príncipe, Castro, Guarapuava, Morretes, and Guaratuba.

Rivers.—The province of the Paraná is well irrigated by rivers, the principal of which, according to their local importance, are the following: Rivers Paraná, Paranapanema, Uruguay, Tibagy, Ivahy, and Yguassú; also the smaller rivers Itararé, Piquiry, Pirapo, Yguape, Negro, Cinzas, Jopim, &c. There are, besides, a

vast number of smaller streams. The river Paraná, which gives its name to the province, and, after junction with the rivers Paraguay and Uruguay, forms the River Plate, may at a future time become variously available for purposes of commerce. It is at present navigated without difficulty by canoes from the fall of Urubú-Punga, in the province of Goyaz, nearly opposite the river Tiete in St. Paul, to the island of Sete Quedas (seven falls), the distance being upwards of 90 leagues. The Sete Quedas is on the confines of Paraguay with the province of Matto Grosso, and from that point to the confluence with the river Yguassú to the southward the river Paraná can scarcely be considered navigable, as the impediments are innumerable. However, below the Yguassú, until the junction with the Paraguay—on the authority of Azara and others likely to be well informed—it would appear that the river Paraná is navigable for small craft, the difficulties diminishing as the junction is approached; but it does not appear that any authentic explorations have taken place to ascertain the capabilities of this river.*

The Tibagy and Ivahy are navigable throughout almost their whole course by canoes, and are valuable auxiliaries to the province, as, with the rivers Paraná and Paranapanema (largely navigable, but with rapid current), they form a very available means of communication with the provinces of Matto Grosso (by the Yvenheima and Brilliante), Goyaz, and St. Paul, as well as with Paraguay.

The Tibagy, Yguassú, Cinzas, and various other rivers in the Paraná, are at the present time very imperfectly known: it is, however, established that there are waterfalls, shallows, and impediments in the navigations, but no insuperable obstacles.

On the Yguassú, near its confluence with the river Paraná, there is a fall lowering the level 170 feet, and impeding the navigation, and there exist others of less importance; but canoes can trade along many sections. A principal obstacle to the development of the river-navigation arises from the great falls (Salto Grande) of the Paraná, where, the river narrowing, the immense weight of water rushes down with enormous force, impeding navigation.

Lakes.—There are no important lakes in the province; there are, however, several large estuaries of the sea, such as at Paranaguá, Cananea, and Guaratuba: the first-named, reaching to

* "The Spanish officers appointed to determine the boundary-line between the possessions of Spain and Portugal in virtue of the Treaty of St. Ildefonso of 1777 surveyed the River Paraná as high as the Tiete, as well as the whole of the Uruguay, and their most important affluents. The results of their labour may justly be ranked among the most important geographical surveys of the last century."—See Sir Woodbine Parish's work 'On the Provinces of the Rio de la Plata,' 1852.

Antonina, is suitable for shipping; the others for boats and fishing-craft.

Ports.—Paranaguá is the only considerable port in the Paraná. The bay is entered by four channels, N., E., S., and S.E., formed by the mainland and the islands of Picas, Mel, and Cotinga. The south-east and north channels are the most frequented; the south-east being the deepest, with $2\frac{1}{2}$ to 3 fathoms at low tide.

The city of Paranaguá is situated on the south side of the bay, at about 30 miles' distance from the entrance. The population is about 5000. There is here established (since 1827) a custom-house—the only one in the province—also an hospital, and various public departments. A captain of the port resides at Paranaguá, and for the service of the pilotage there are eight pilots; hitherto no public pilotage regulations have been framed, and the remuneration received by the pilots is usually arranged by private agreement between them and the shipmasters.

The bay of Paranaguá is an immense extent of water stretching northwards and westwards from the city; it is throughout navigable, and known to be deep in parts, but has never been regularly surveyed. There are many anchorages; the principal of which for foreign vessels, next to those at the ports, are that of Quarantine and that near the *Isla de Cotinga*. The bay and river are navigable to the westward, about 100 miles to the port of Antonina, to which place there is an average depth of nearly 16 feet water. The channel is buoyed.

At the port of Antonina there was created in 1855 an establishment for the collection of dues, and arrangements were made to admit foreign trade. Since that period the port has much increased in importance, as it has been found that, Antonina being on the high road to the interior localities, by receiving and shipping goods at that port a troublesome and damaging land-carriage between Paranaguá and Antonina is avoided. An excellent road, now being formed, between Antonina and Curitiba, will yet further promote the prosperity of the former.

The bay of Paranaguá receives many small rivers, some navigable for large craft, but almost all available for canoes for some distance. The principal are the Nhundiacuara, on which is the town of Morretes, navigable for 7 miles from the bay; the Guaraquassú (navigable); Guarakessaba; Cachoeira (on which is Antonina); Serra Negra; Tagaçaba; and Sagrado. The banks of most of those rivers are covered with excellent timber, which used formerly to be largely shipped at the various localities, but by a late local regulation the shipment is prohibited except in certain specific places.

A canal is projected by the river Varadouro to connect the bay of Paranaguá with that of Trapande, which is also a large sheet of

water, and reaches to Cananéa to the north. Such a work would be extremely useful to the locality, especially in promoting the fisheries of the district—forming, as it would, a communication inland between Paranaguá, Antonina, and Morretes on the one side, and Cananéa, Xiririca, Iguape, and the river Ribura, in St. Paul's, on the other side.

The port of Guaratuba to the southward of Paranaguá is not available for foreign trade, the water on the entrance to the bay being from $6\frac{1}{2}$ to $7\frac{1}{2}$ feet; but for fisheries it might be rendered useful, not only from its position and the quantities of fish there existing, but also from the excellent timber near thereto suitable for constructing boats, &c.

The bay of Guaratuba receives the waters of the rivers São João, Cubatão, Minas, Doce, &c. The river Sahy, which separates the Paraná from St. Catherine's, also adjoins. The bar seems capable of improvement.

At present there are no ports on the interior rivers where foreign goods can be received; nor can this be expected, as the western country is unexplored and almost unknown; but there is no doubt that at a future time an interior commerce will take place, because, as the Paraná touches on Paraguay and the Argentine Provinces, goods will probably be conveyed through the different water-communications more cheaply to the western parts than by the present expensive and tedious land-carriage.

Topography.—The Paraná rises gradually from the Atlantic Ocean in well-wooded and watered districts to the heights of the Serra do Mar, which is the assumed boundary with the province of St. Catherine's; from this an offset called the Serra Negra, to the north of Paranaguá, connects those hills with those of St. Paul's. Passing to the westward of those mountains there is a large diversified plain, in which the capital Curitiba and the towns of Castro, Príncipe, and others are comprised. Passing still to the westward, the limits to which civilization has reached may be considered the town of Guarapuava, and the colony of Santa Theresa to the west; from which points to the confines of the province on the rivers Paraná and Uruguay there are immense forests. The territories beyond Castro to the north-west are also but little known.

The parts unexplored, comprising nearly two-thirds of the whole province, are understood to be peopled by native Indians, and to be thickly wooded with valuable timber. The banks of the rivers are almost the only portions examined, and those very imperfectly.

Guarapuava.—This was an ancient Indian settlement; but the Indians have gradually become confounded with the general population, and the town has increased in importance. Many Brazilians

have married Indian women, and the general report is that they are good and faithful wives.

Palmas.—This settlement is formed of the tribes of Viri and Conda. Half-civilized, it is maintained principally to protect the settled inhabitants against the incursions of the Indians.

S. Pedro de Alcantara has been formed not far from the embouchure of the river Tibagy into the Paranapanema. The number of residents is about 50, but, more or less, 300 Indians, Cayuas, from the wood visit the place.

Pirapó is on the Paranapanema, about 40 leagues from the Tibagy. The settled inhabitants are less than 30, including negroes, but Indians occasionally visit the locality.

Yatahy is a military colony established near the junction of the river Tibagy with the Paranapanema, for the purpose of attracting Indians and facilitating a communication with Matto Grosso. By the last accounts there were about 50 Indians—chiefly Coroados—there, but not permanently settled.

S. Jeronymo was agreed upon in 1859 as a settlement for Coroados Indians; at the commencement of 1860, thirty-two had arrived, but I have no later information.

Chagú was established at the same time, to remove thereto the tribes at Palmas, and to attract the numerous hordes in the neighbourhood; this position, from its nearness to the forests and reported healthiness, being deemed preferable.

It is also proposed to form in the south-west district two military colonies for the attraction of Indians and protection of the settled parts. These colonies will probably be formed on the rivers Jopim and Xapeco.

Santa Theresa.—This colony is well situated, high up on the river Ivahy, removed from the settled parts of the province, and on the confines of the forests. From Santa Theresa the Ivahy is navigable for canoes to the Paranapanema, through which a communication is formed with the river Paraná. The lands in the neighbourhood of this colony are said to be very fertile; the principal productions being sugar-cane (used for making spirits and coarse sugar), maize, rice, wheat, mandioca, beans, bananas, tobacco, and cotton. The value annually sold beyond the consumption of the colonists may average about 1000*l*. Santa Theresa was established in 1847 by the late Dr. Faivre, a Frenchman, with 79 of his fellow-countrymen; and although the original settlers left, this interesting nucleus of population seems to have become established, as will be seen by the adjoined data of the inhabitants it contained, viz.: in 1847, 79; in 1854, 94; in 1856, 190; in 1857, 196; and in 1858, 200. Of those last mentioned about 180 were Brazilian and the rest French.

Supraguy was established in 1851 by an enterprising Swiss or

Frenchman near Paranaguá, and to the northwards along the coast district. The plan adopted is to fix an equitable rent for the land, and give the tenants option of at any time becoming proprietors on payment of twenty years' purchase. The population has been returned as follows in the years mentioned, viz.: in 1854, 35; in 1855, 64; in 1856, 403; in 1857, 450; in 1858, 496. Of the last-named number, 436 were Brazilians and 60 foreigners. The population are employed in agriculture and fishing, about half their profits arising from the latter occupation. The exports amount to about 2000*l.* yearly.

Besides the colonies mentioned, there are various small settlements of Germans and others in the Paraná. The Germans in the neighbourhood of the Rio Negro, an ancient settlement, number about 350. The formation of various other colonies is contemplated; the most notable of which is that which the Provincial Government would establish at Assunguy, west of Antonina. The land is stated to be fertile, and is sold at $\frac{1}{16}$ parts of a penny per 6 square feet. The province devotes 1000*l.* annually to promote immigration.

XIII.—*Notes on Cambodia, the Lao Country, &c.*

By M. HENRI MOUHOT.

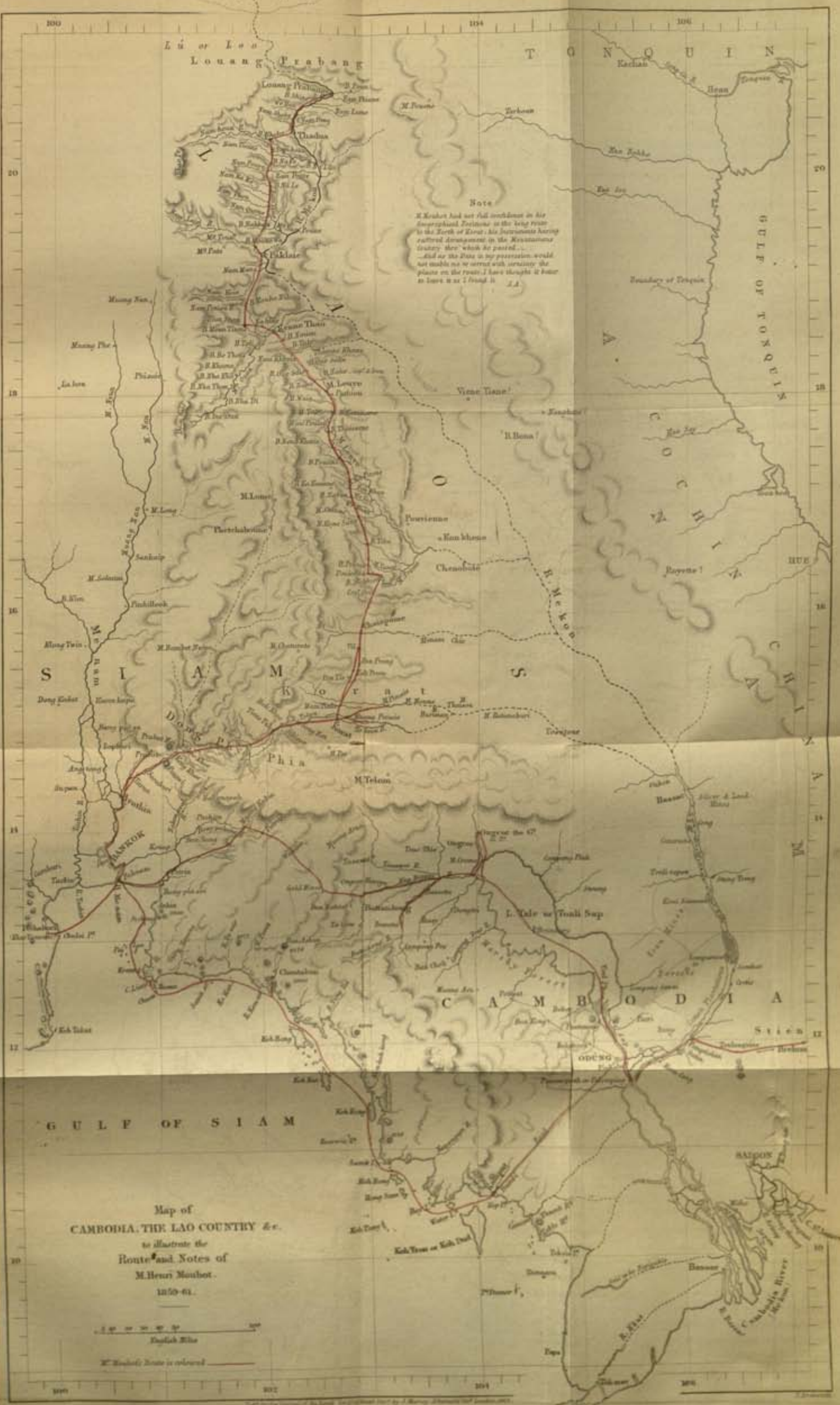
[Translated from the original French, by Dr. THOMAS HODGKIN, M.D., &c.,
Foreign Secretary.]

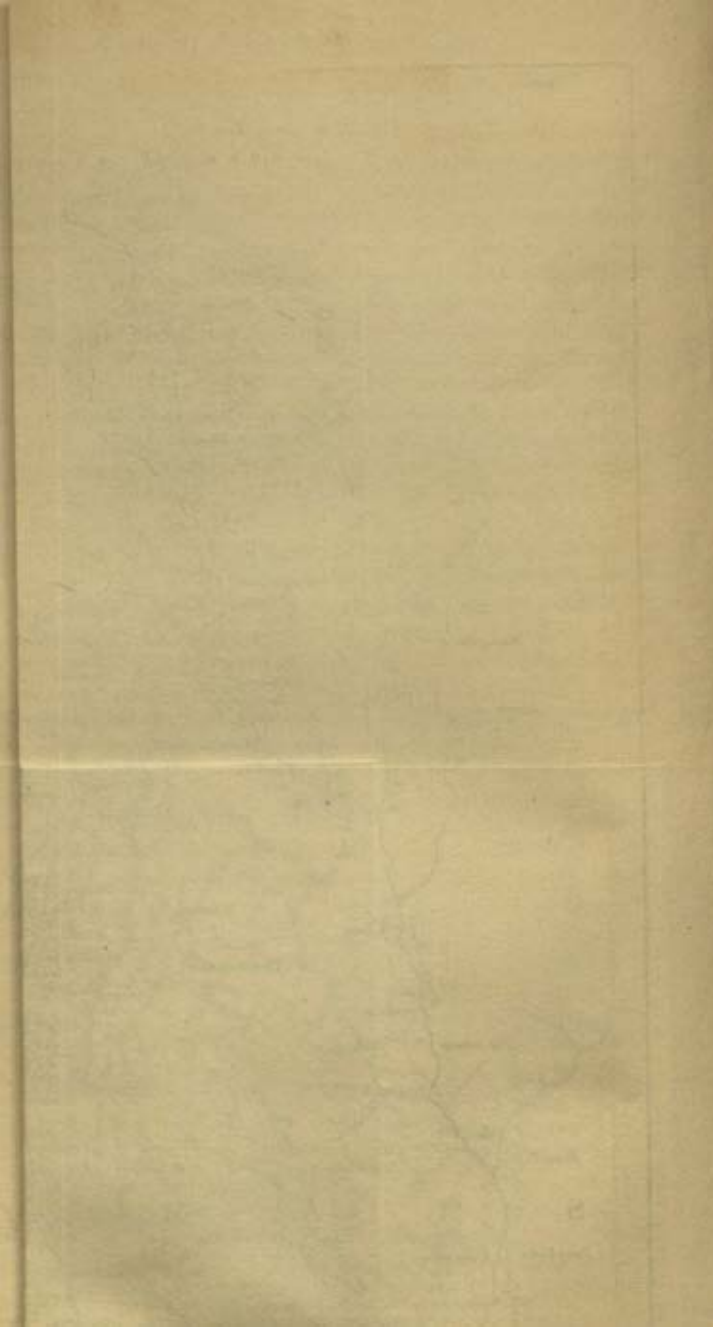
Read, March 10, 1862.

Brelum, among the savages of Stien, N. lat.
11° 58', E. long. 107° 12', 15th Oct., 1859.

MY DEAR MR. STEVENS,

FOR the last two months I have been in the forests with the uncivilized inhabitants of Stien, in the latitude indicated above, where I remained during the most favourable season for collecting insects and land-shells. Although the King of Cambodia had given me a letter, in which he ordered all the chiefs of the Srokkhner in the Cambodian villages to furnish me with the means of transport on my route, I had much difficulty in arriving here, because we could frequently find neither buffaloes nor carriages in the hamlets through which we had to pass, and because the Cambodians are the worst species of animal on the globe. Like the ass, they are not to be roused from their lethargy, almost approaching stupidity, but by the application of the stick. Thus I accomplished my journey, which lasted nearly a whole month, that is, three times longer than it would have taken me to go on foot. On the 21st of July, after having descended the great branch of the Me-kon from Pinhalu, a village 9 miles from the capital (in N. lat. 11° 46' 30",





E. long. $103^{\circ} 3'$, mer. of Paris), as far as Palomping, a town of great commerce, inhabited by Chinese and situated at the junction of the two streams, I ascended the great river of Cambodia. The water was still low, for throughout the country the rainy season was two months later than usual. The Me-kon is covered with islands, some of which are 8 or 9 miles in length, and more than a mile in breadth. Such is the large and beautiful Isle of Kō-Sutin, where I arrived after a march of 5 days. You may imagine the size of the river, which I estimate at nearly 3 miles broad. Pelicans roam about the waters in flocks of 50 or more. The shores, especially where they are sandy, are covered with thousands of storks, sea-swallows, and other aquatic birds. The general aspect of this river, however, is rather melancholy than gay. This mass of water flowing with the rapidity of a torrent is, doubtless, a very imposing sight; but that is all: only a few canoes are seen upon it, and its shores are almost deserted (the Me-nam is much more cheerful and lively). Thirty or forty leagues to the north of the Kō-Sutin, on the confines of Lao, the rapids and cataracts commence. It is then necessary to leave the larger crafts to take to canoes, which, as well as the baggage, have often to be conveyed by men. The current is so strong that, at some seasons, one can scarcely travel more than a single league a day, and occasionally (such are the windings of the river) the boatmen go in the evening to fetch their fire from the very spot at which they had cooked their rice in the morning. I had a small boat and 3 rowers; but at every turn we could scarcely struggle against the current, and it required the greatest efforts and pulling by the rushes to prevent our being carried back. Eight days after leaving Pinhalu we arrived at Pemp-tielan, a large Cambodian village, whence I had to continue the journey by land. There still remained 150 miles to travel by carriage, constantly in an easterly direction. The mandarin whom I found in the village, and who has been entrusted by the Government with the charge of all this part of the country, received me very kindly; and after two days I was prepared to proceed on my journey. On the first day our carriages were overturned, and it seemed as if it would be impossible to proceed. This happened in the midst of frightful bogs, and the carriages sank up to the axletrees, and the buffaloes up to their loins. Fortunately the following day the roads improved, but for 3 weeks together we saw only a few small rice-fields scattered in the neighbourhood of the tents, as we were constantly travelling through a swampy plain covered with a thick shady forest, which reminded me of the enchanted forests of Tasso. One could almost imagine that from each tree some fairy being might issue, and easily conceive how the imagination of a pagan people, when

greatly excited, might convert these retreats of huge and ferocious wild beasts into the abodes of evil genii. Twenty times an hour the men who accompanied us, in addition to the drivers, were obliged to cut the branches or remove the trunks of trees which obstructed our passage, or to open up a new track. All the way since our leaving Pinhalu, the Cambodians were in a state of astonishment at seeing us directing our course to the Stien, and that, too, in the worst part of the year; for the rains had commenced, and even those who reside the nearest to the Stiens dare not run the risk of going: and if I had not brought with me from Siam the two young men whom I had in my service, I should not have been able at any price to have induced a single person to accompany me. It was with very great reluctance that my men advanced, for, at Siam, Cambodia has a terrible character for its unhealthfulness. Unhappily for my servants, as well as for myself, both of them were attacked with fever in the midst of these woods, so that until now, instead of having assistance, I have had two patients on my hands. In passing through a village, of which two-thirds of the inhabitants were Annamites, a villanous set of people, I was in danger of being taken prisoner by them, and of finishing my explorations in their dungeons, where the only entomological specimens for me to collect are certain 6-footed animals; but they are so large and so fat that they are a treat to the people. The previous year the waggons belonging to the French missionaries had been completely stripped, and the men who accompanied the caravans were bound hand and foot, and sent to Cochin China. I showed a bold front, dared them to attack me, and loaded all my firearms in their sight. This exasperated them much; and for the two following days I was so apprehensive of falling into an ambuscade, that I proceeded pistol in hand, and my finger on the trigger. My assurance had the desired effect, and I was neither stopped nor molested anywhere.

Notwithstanding the fatigue, heat, and privations inseparable from such a journey, I was myself in very good health. When I arrived on the 20th of August amongst the Stiens, at a place called Brelum, I found an outpost of Catholic missionaries attached to the Cochin China mission, and a few miles from the southern frontier of that country. To have proceeded farther would have been impossible, for we should not have found the necessary means of carriage, or a farther supply of provisions. At this season of the year these poor savages have invariably consumed their stock of rice; and all they have to subsist upon are herbs, a small quantity of maize, and the scanty produce of the chace. I therefore accepted the hospitality offered to me of a kind priest, whose house was fortunately well supplied. In a week or two from this time the rainy season will be over, cold nights immediately follow,

and for many months nothing can be done with insects; but the birds will then have their turn, and I shall devote myself almost exclusively to them. My departure from this place will depend upon circumstances. I may, perhaps, be the bearer of this letter to Pinhalu; perhaps I may be detained here for some months, in consequence of the bad state of the roads, and the impossibility of procuring a carriage during the rice-harvest. If I were asked what are these strange people who live secluded upon the mountains and plains of Cambodia, which they seem never to have quitted, and who in their manners, language, and features differ altogether from the Annamite Cambodians and the Laos tribes, I would say I incline to the belief that they are the aboriginal inhabitants of that country; and that they have been driven into the position which they now occupy by repeated migrations of the Thibetans, from whom the Siamese and the people whom I have just mentioned are evidently descended, and who no doubt have one common origin, as shown by their features, religion, manners, &c.

All the country from the eastern slope of the mountains of Cochin China as far as 105° of longitude (east of Paris), and from the 11th degree of latitude as far as Loo, is inhabited by savage tribes, who are known by a name which signifies Inhabitants of the Highlands. They are not attached to the soil, but are continually moving about. The villages are, for the most part, in hostility with each other: they do not fight in troops openly, but rather seek to make attacks by surprise. The prisoners whom they take are sold as slaves to the Laos. Their only weapon is the arbalet (or cross-bow). It is of extraordinary strength, and they use it with great dexterity; but seldom at a longer distance than 20 paces. They do not use poisoned arrows, except in hunting large animals, such as the elephant, rhinoceros, buffalo, and wild ox. The smallest puncture is sufficient to cause death, and it seldom happens, if the poison be fresh, that the strongest animal after receiving the wound has power to go more than 50 paces before it falls. They then cut out the poisoned part, and slightly roast the animal without skinning or cutting it up, that it may keep the better. After this is done, all the inhabitants of the village are called by the blowing of a trumpet, which may be heard to a great distance, to receive their share. The most perfect equality and fraternity exist in these little communities, and those who advocate all things in common would be surprised to find all their theoretical doctrines carried into practice, and productive of nothing but misery, here at least.

The strongest European could not bend the bow which one of the weakest of the Stiens would draw without effort; such is the result of habit. The Stiens are not altogether without agriculture. They cultivate rice, water-melons, gourds, bananas, and a

few fruit-trees. Their rice-plantations are kept in the nicest order, but the greater part of the work is done by the women. During the rainy season the men seldom go out, on account of the leeches, which multiply to such an extent in the woods as to render them inaccessible. They keep to their fields, in which they build huts of bamboo; but when the harvest is over, and the healthy season returned, they give themselves wholly to fishing and hunting. They never go out without a basket at their back, and in their hands their bow and a bamboo stick with a large blade of a knife fixed at the end of it. They forge nearly all their instruments from iron ore, which they procure from Annam or Cambodia. Although they know how to mould and burn earthen vessels, they generally cook their rice, their vegetables, and even their meat, in bamboos. All the clothing which the Stiens wear is a piece of cloth a hand-breadth wide, which is applied as a bandage, and more or less hides their nakedness: these bandages are woven by the women. They are of considerable length, and are worth as much as an ox a-piece, when fine.

The Stiens are very fond of ornaments, and the women especially always have rings made of thick brass wire on their legs, arms, and fingers, and wear collars of glass beads round their necks. They have enormous holes made in their ears, in which they put a bone of some animal, which is often more than 3 inches in circumference. They wear their hair long, like the Annamites, and they keep it twisted and in form by means of a bamboo comb. They likewise wear in their hair an arrow made of brass wire, and ornamented with a pheasant's crest. The Stiens have handsome and sometimes regular features; many of them have beards, or rather good moustaches and imperials. Being quite isolated and independent in the midst of these forests, they scarcely recognise any other authority than that of the chief of their village, whose power is generally hereditary. Within the last year or two the King of Cambodia has occasionally sent the mandarin who lives the nearest to the Stiens as far as their first village, and he has given to some of their chiefs seals and titles of honour, hoping by these means to bring them gradually to subjection, and to be enabled at some future time to obtain slaves and ivory. Already there are some few who pay a small tribute to him every three years. Nevertheless, his emissaries scarcely dare to pass beyond the boundary, fearing the arrows of the savages and the fevers which prevail in their forests. The Stiens have not the roughness of the stupid yet proud Cambodians, nor the refined cruelty and corruption of the Annamites. They are the goodnatured children of the forest, simple, and even generous: their faults are such as are common to all Asiatics, namely, cunning, extraordinary power of dissimulation, and idleness. Their passion is hunting, and the

more laborious work is left to the females. There is, moreover, another difference between them and the Cambodians, inasmuch as theft is of excessively rare occurrence among them. They believe in a *Supreme Being*, but they only pray to the *Evil Spirit* that he may leave them in peace. They bury their dead near their dwellings, and cover the grave with a little roof of leaves, that the spirit of the departed may come and rest there, and eat the rice and drink the wine which they take care to place in small tubes of bamboo. They likewise place similar offerings beside the paths which were frequented by their relatives, as well as in their rice-fields. This custom reminds one of similar practices among the Chinese: "Come, poor soul," they say, "and visit us often. Here is rice to feed thee, water for thee to drink, a place for thee to rest, and arrows to shoot with." They do not believe in the transmigration of souls, but they think that beasts have likewise souls, which continue to live after their death, and which wander about the places which they frequented when alive; therefore, when they kill an animal, they offer a little sacrifice lest its soul should come and torment them, and they beg its pardon for having deprived it of its body. In the case of some large and formidable animal, such as an elephant, the ceremony becomes important, and all the village take a part in it; and for several days songs and the beating of the tamtam are made to resound in order to appease the soul of his Majesty.

The Stiens have many superstitions. The cry of an owl at night, the sight of a raven when they are starting for a journey, are bad omens, and sufficient to make them change their plans. When any one is ill, they say that the *Evil Spirit* torments him; and to deliver him they set up about the patient a dreadful din of noise, which does not cease night or day until some one among the bystanders falls down, as if in a syncope, crying out, "I have him—he is in me—he is strangling me." Then they question the person who has thus become possessed. They ask him what remedies will save the patient. What does the *Evil Spirit* require, that he may give up his prey? Sometimes it is an ox or a pig; but too often it is a human victim also, in which case a poor slave is seized without mercy and sacrificed to the demon. These miserable savages believe that the whites live in small corners of the earth in the midst of the sea; and such is their simplicity, that they often ask if there are any women in our country. If in joke we tell them that there are not any, and that if a man wishes for offspring he pulls out a few hairs and plants them, and that by the help of the sun they come up marmots,* they would be ready to make the trial if they were not undeceived.

* "Marmot" is the French nursery name for a child.

That of which, in consequence of the difficulty of communication and of the dread which the petty Cambodian and Annaman traders have of entering their country, they are most in need, is salt. It is probably to this cause that the great number of cutaneous diseases which occur among them must be attributed. It is not without reason that their forests are considered unhealthy; the Stiens themselves often suffer from fever. Two French missionaries, who like sentries occupy this distant station, have frequently been attacked with illness; and of the 15 Annamites in their company, two-thirds have been constantly on the sick-list. Nevertheless, notwithstanding my toils and wanderings, my health continues excellent, and I have been at work with the hatchet as well as with the net. We are surrounded by tigers, rhinoceroses, buffaloes, and wild oxen; but these formidable neighbours cause more fear than harm. If they leave their inaccessible retreats during the night, the sight of the most timid man makes them flee at daybreak, and to come at them it is necessary to pursue them for a long time, or to lie on the watch for them at the pools.

X The fauna of this country differs but little from that of Siam and of Cochin China. I have found many things, both good and new, and I shall probably find them again at a future time, in the first-mentioned country. The bamboo-woods, which I had long neglected, have especially afforded me an abundant harvest of long-horned coleoptera, of which I was deficient. We may prepare the day before for collecting them: all that is necessary for this purpose is to fell some of these trees by the sides of the paths, and leave them in an oblique position, their tops being supported by those of the neighbouring bamboos. On coming again at the hottest part of the next day, you are sure to find these beautiful insects either hid near to the joints of the trees, or at work making holes in their trunks.

You will be much pleased, my dear Mr. Stevens, to learn that some very beautiful shells are to be found, and that I have endeavoured to obtain as many of them as possible.

When, and more especially how, I may be able to return to Cambodia, I know not yet; and I dare not think of the difficulties which I shall have to encounter with the villanous Cambodians in the conveyance of my treasures. My insect-boxes will have a terrible jolting, enough to break my heart. I entreat you to join your prayers to mine that the beautiful collection which I have already made, but which I hope still to increase, may reach you safely; or that, at least, a portion of it may be in a state to render some service to Natural History. These are the trophies which we poor soldiers of science obtain, and when we lose them, the pain is the greater because they have cost so much labour in gaining them.

If the war with Annam cease, I may visit a corner of that country, and return by water to Pinhalu; but I have not much expectation of doing so. Those who may live will see.

Commending myself to your kind remembrance, I bid you adieu; and from the midst of our Etat Major I wish you as much pleasure as I enjoy in the forest of the Stiens.

May God preserve you from their arrows!—Yours, &c.,

H. MOUHOT.

[This enterprising, courageous, and industrious traveller returned in good health to Pinhalu in the evening of the 19th of December, 1859, and the next day added a short postscript to the foregoing letter, stating his plans for the future, describing the numerous packages in which his valuable collection was about to be forwarded, and the various difficulties, dangers, and losses which it had sustained.]

He was then on the point of proceeding northward to visit some celebrated ruins and return to Ban-kok.]

To Dr. NORTON SHAW, *Secretary to the Royal Geog. Soc., etc.*

Khao Tamoune, Province of Pechaburi, Siam, lat. N. $13^{\circ} 4'$,
long. E. of Greenwich 100° , 15th June, 1860.

SIR,—IN a letter which I addressed to you in March, 1859, I had the honour of informing you of my having discovered two active volcanoes in the Gulf of Siam—one in the little island of Ko-Mun, lat. N. $12^{\circ} 34' 29''$, long. E. of Greenwich $101^{\circ} 41' 2''$; the other submarine, in lat. $11^{\circ} 49'$, long. $102^{\circ} 31'$ —and of the probable existence of many others, of slow and latent action.

Since that time I have continued my researches and passed through Cambodia, from east to west and from south to north, up the Me-kon, near to the frontier of Laos. I visited one of the savage and independent tribes which live between these two countries and Cochin China; then, having crossed the Lake of Tonli-Sap, and explored the provinces of Ongcor and Battambang, where there are superb ruins and a monument, the Temple of Ongcor the Great, almost perfect, and such that the like is probably not to be found in any part of the world, I passed from the basin of the Me-kon into that of Menam, setting out from Battambang, and crossing to the west as far as Ban-kok.

A slightly elevated plain, of which the inclination is so small that during a march of a week to reach the summit it is quite imperceptible, separates these two basins. A mountain chain, of which the principal summit at the south is 6274 English feet above the level of the sea, extends s.w., and then s.s.w., joins the ranges of Chantabun, of Pursut, and of Tung Yai, which are also 4000 or 5000 feet, and reaches almost to Kamput and Hatuncue; whilst towards the north, another chain, given off from the

great chain of Korat, 4000 feet in height, runs from the west E. by S., and gives some branches to the provinces of Battambang and Ongcor Boreye, 40 miles to the north of Battambang, and turns round the province of Ongcor, where it bears the name of Mountain of the Somarais.

I lately sent to my family, after my return to Ban-kok, a long description of my journey, several drawings, maps, and plans, to be communicated to Mr. Arrowsmith, and which I hope you will also see.

I am induced to call your attention to these wonderful remains of the civilization of a great people which has doubtless ceased to exist, and also to the whole of this basin, which is rich in woods and mines, and, although thinly inhabited, produces *cotton* in sufficient quantity for the entire consumption of Cochin China; whilst the Great Lake is so immensely rich in fish, that it supplies them in large quantities to Cochin China, and also to China itself.

The iron which abounds in this country is really of a superior quality; and the Kouis, an ancient tribe, of a primitive race, who live to the west of the Me-kon, and who speak the same language as the Stiens—savages to the east—are industrious in working it. There are also many other mines rich in gold, argentiferous lead, and in copper, in the mountain chains to the east and west. The Pursut range produces the beautiful cardamom, which, when transplanted, furnishes very fine stems, but, unfortunately, no fruit. Unhappily the greater part of these mountains are dreadfully unhealthy, and none but the natives, and those who have worked there from their childhood, can remain even for a few days without suffering.

Were Lower Cochin China opened up, and presenting easy means of communication, Cambodia would probably equal it in productions, and would surpass Siam, so soon as an enlightened administration should direct its certain advancement; and when, as is most to be desired, Chinese planters and active and industrious Annamites would emigrate thither.

In two or three years one might completely change the face of the country; and I would have you observe that it appears to me that nothing would be easier than to assume the protectorate, if not to gain the possession, of this country. I cannot now say more on this subject; but you know, Dr. Shaw, that I am, and always shall be, at your disposal, to give you all the further particulars which you may desire.

The motive which now prompts me to write to you is, first, to announce that in the island of Phu-Quoc, or Koh-Tron, belonging to Cochin China, and near to Komput, there are rich mines of *coal*. I have not been able to go there, as the war has made the people hostile and cruel to all whites; but, my attention

having been taken by some objects of ornament made out of this mineral by the islanders, I succeeded in obtaining two specimens, which I sent, with other collections, to Mr. Stevens, of London. I wished likewise to tell you of several extinct volcanoes in the province of Pechaburi, which I am beginning to explore; four of which I have ascertained to form a part of the numerous detached conical mountains, which are probably ancient craters of the great chain of Kaho-Deng, or Deng Mountains, which occupy all the centre of the northern part of the Malay peninsula, and are inhabited by the Kariens, a primitive and independent race, which, like the Stiens and other mountaineers of this region, have doubtless been driven into the mountains by the invasion of the Siamese, and are protected, by the inclemency of the climate, against all the attempts which their neighbours may make to subjugate them. The mountains of this range which stand most in advance are known in the country by the names of Makaow Khao, Panam Knot, Khao Tamoune, and Khao Samroun. The last two are 1700 feet and 1900 feet above the level of the sea, and only a few leagues distant from each other. All these craters appear to have been originally upheaved, or craters of elevation, as Leopold Von Buch styles them, and to have risen from the bottom of the water, at a period when all this part of the country, so far as the great chain, which I have not yet been able to visit, was under the sea. Besides an immense volcanic cone, in part fallen in, and where the ground sounds under one's feet, each of the mounts has several lateral mouths and an immense number of fissures and chimneys, or passages, in which the traces of subterranean fires are very evident. They are entirely composed of trachytic rocks, scoria, lava, felspar, &c. The Siamese have made temples of the largest of these caverns, which are of great depth and breadth, and very picturesque. One of the caverns of Mount Samroun is quite inaccessible. Having descended to the depth of 20 feet, by a chimney 2 feet wide at its mouth, and shut in between the rocks, I found myself at the entrance of a deep cavern, but there all my attempts to proceed farther were defeated. At two paces from the entrance my torch suddenly went out, my breathing was checked, and I in vain fired several guns, in order to introduce air fit for respiration.

I intend, towards October or November, to continue my explorations and complete my acquaintance with the country, by starting on another tour for a year and a half, to the north-east of the Lao, that is to say, of Ban-kok, in the basin of the Me-kon, towards the frontier of China. Unless prevented by the inadequacy of my resources, I hope to carry out this design, simply from the desire of rendering some further service to science.

H. MOUHOT.

Western Lao, State of Louang Prabang, lat. $20^{\circ} 53'$,
long. $102^{\circ} 35' 3''$, 1st August, 1861.

In January last I quitted the Siamese province of Saraburi, where, during four months, I had been making active exertions to enable me to penetrate into Western Lao, so as to explore the basin of the Me-kon. Unhappily I was obliged to return to Ban-kok in March, after having proceeded 350 miles, and with great trouble and expense, to claim more protection than had hitherto been accorded me, and a passport, to prevent the difficulties which the mandarins, no less greedy and jealous here than in China, continually throw in my way. In October, 1860, a letter of recommendation was given to me by the Krome Loucong Wongsas, who is considered to be the prince most favourably disposed towards Europeans, having the superintendence of all the country through which I proposed passing: this letter, however, proved to be anything but useful. Notwithstanding my entreaties and valuable presents, I could obtain nothing better; nevertheless I set out, determined to fight my way (if fighting were necessary) to attain my ends.

I had scarcely arrived at Saraburi when, seeing the inefficacy of my papers, I was obliged to change my tone of simplicity and moderation for one of discontent and threatening, alone understood here by those invested with a little authority. However, after a long delay I at last obtained means of transport, and again reached Korat. There the same difficulties were about to recommence which before had caused me to return to Ban-kok; but I now profited so well by the lessons which had been given to the Chinese by our cannon, that I drew from the governor of the province a letter, no longer in emphatic, though insignificant terms, but so well written, notwithstanding its laconism, that it was sufficient to enable me to traverse, not only without difficulty, but almost without expense, all the western part of Lao, from Korat to Louang Prabang. Thus all the ministers united could not obtain for me sufficient protection so as to oblige their subordinates to grant me the means of transport for payment; and now a governor of a province obtains it for me gratuitously. Several diplomatists have pictured these men as being enlightened and full of benevolence—to them, it is possible, either from fear or the hope of gain; but, believe me, they are only a set of slaves; and, as slaves, they possess all the vices which their fearful despotism can produce—an extraordinary cunning, villany, jealousy, and sordid avarice—not to mention the still greater vices common to the whole race, beyond and on this side of the Ganges and the Me-kon. As for the people, they are good, because they suffer.

* In M. Mouhot's original drawing, Louang Prabang is laid down in lat. $20^{\circ} 44' 30''$ N.: it is so retained in his map.

I have found great errors in the best maps which have been published of all this part of the country.

I have traversed three times "the Forest of the King of Fire"—Dong Phya Phai—which separates Korat from the ancient Siamese provinces. This thick jungle covers a space of 30 miles in length; that is to say, the chain of mountains which separates the basin of the Me-kon from that of the Menam, and which serves as an epaulement to the plateau plain which extends beyond to the north and north-east.

After passing the mountains you come to a sandy, and generally barren plain, producing nothing but resinous trees of stunted growth, bamboos, underwood, and grass. Where the soil is richer, you generally find rice-fields and banana-trees. I discovered magnetic iron and oligiste. In the bed of a torrent I also discovered gold and copper in two different points. This district is rich and abundant in precious minerals, but neglected or unknown until now, except by a small tribe of 400 or 500 Kariens—without doubt a remnant of the aborigines, who a short time ago, to preserve their independence, retired into parts almost inaccessible, 30 or 40 miles to the east of the parts traversed by the caravans. Panthers, elephants, and other wild beasts, are the only inhabitants of this mountain, which the natives consider to be the sojourn of death, on account of its insalubrity. Korat Ongcor Aithe of the Cambodians was formerly the bulwark of Cambodia on the north and west. A solid rampart, supported by a large epaulement—the work of Khmer Dome (ancient Cambodians)—still surrounds the town. It is at present governed by a Siamese mandarin of the first class, a kind of viceroy. The ancient inhabitants have nearly disappeared, and it now contains only about 300 descendants of Chinese, small resident merchants; 300 other individuals, who traffic about the country; besides 1500 or 2000 Laotians, Cambodians, and Siamese, who, like wolves or jackals which follow the armies or caravans, have come there from all parts of the kingdom, or probably have remained there after the wars of Lao and Cambodia, to lead a life more in harmony with their inclinations, in attacking travellers and Chinese merchants—a den of miscreants, void of all good feeling, with the exception of a small number.

Two temples are found in the environs—which do honour to the founders of the Cambodian edifices—one of which is in a pretty good state of preservation. Style, architecture, workmanship, all are alike; one would say that the same artists and workmen had made the plans and put them into execution. Again you see those immense blocks, exquisitely cut, and joined together without cement, covered with chiselling and relievos. One of these temples

is situated at about 30 miles from the town, to the east, and is said to have been founded by a queen; the other, only 9 miles to the east, is said to have been founded by the king, her husband. Much farther to the east they say others are to be found, but I have not been able to visit them. Want of means for the easy and advantageous removal of merchandise upon the Me-kon causes Korat to be the central market for all the eastern part of the country. There they bring all the silk of Lao (Langoutis), robes, skins, horns of ivory, peacocks' tails, &c., which the active Chinese merchants sell again with a good profit at Ban-kok (notwithstanding the numerous taxes they have to pay); having brought from thence cotton and other useful articles of Chinese and European manufacture for the use of the natives. There generally passes daily through the Forest of the King of Fire a caravan of from 100 to 150 buffaloes. With protective, instead of aggressive laws, an enlightening, civilizing, and honest administration, this commerce would increase threefold in a very short space of time.

Notwithstanding the small population of the town of Korat, it is the chief town of an extensive state, containing eleven towns or boroughs, chief towns of districts, and a great number of villages, more or less populated. Fifteen days' march conducts you from Korat to Bassar, on the borders of the Me-kon, under the same degree of latitude.

My intention was to proceed to the north, so long as I could find means of communication, only stopping in the province of Louang Prabang; then to proceed down the river as far as Cambodia. I hired elephants, and five days after—having passed through several villages peopled by the descendants of a Siamese colony which had taken refuge there in time of war, passing continually through forests of resin-trees thinly scattered—I arrived at Ban Prang, a village, where I discovered a tower in ruins; also the remains of an ancient temple. I then arrived at Chaiapume, the principal Laotian town to the north, being the chief town of the district. Here, again, I found more ruins, but inconsiderable, and which appeared to be rather a Laotian imitation than the work of Khmer Dome. The inscriptions of the temples in the province of Korat resemble those of Ongcor. Here I found, upon a block of broken slate stone, an inscription in Laotian characters, though inexplicable to the inhabitants of the country.* Here were, again, with some other remains of idols and towers, at the foot of a mountain in the same district, the only remaining vestiges of that ancient civilization which I discovered in the north. All led me to suppose that here also were the limits which separate Cambodia from Vieng Thiane,

* Sent home.

destroyed during the last war which the Siamese raised against the Western Laotians, or White-bellies, twenty years ago.

It was in this borough that I was stopped in my travels by the vulgar and insolent chiefs, who refused to give me on hire the means of transport, even after seeing my passport. I found that the people gave me a very different reception, which increased my desire to know more of them, and to traverse all the country of Lao; whilst the mandarin refused to sell me rice for my guides, who were, however, men belonging to the Governor of Korat, all the inhabitants came to accompany me, and showed their regret to see me leave discontented, and in blaming their chief, showing their sympathy by presents of rice, fruit, flowers, &c. I had scarcely been a day with them, and I was already more an object of respect than of fear. At Korat it was still better: I had all the population for an escort. As soon as I reappeared, Chinese men, women, and children came out of their huts to accompany me to the same cottage where I had before received their hospitality, and pitying me for having been obliged to sleep in the forests in such fearful weather. During three days it had been so cold that the swallows had dropped down dead in the huts where they sought shelter.

This bad weather had surprised us one evening in our bivouac near a marsh, where we passed a fearful night. The following day we reached a village which we would not leave until the sun reappeared. At Korat I met with a mandarin of the first class, one of the most civilized I had yet met with. He had the charge of a pure white elephant, fattened in the Lao Mountains, for the King of Siam: he offered me two elephants if I would consent to accompany him, one for myself, the other for my servant and baggage. My elephant followed his. The caravan was most imposing. We had for an escort fifty soldiers on foot, beside others on horseback, and followed by as many elephants at every station. I was provided with every comfort; nothing was wanting. At every halt the mandarin sent me refreshments; ducks, fish, fruit, preserves, and biscuits; gave me eight guards to watch round my fire at night, and showed me every attention. In return I discovered to him, in the mountains, mines containing an immense quantity of iron, copper, and even gold, which quite enchanted him, as he was delighted to be able to give this information to the King of Siam.

The whole province of Saraburi was in motion to celebrate the arrival of this great animal, called the white elephant, but only his eyes and the tips of his ears are albino. The King of Siam was waiting for this strange divinity on the borders of the Melar, beyond Dong Phya Phai, with his court and more than

1000 elephants. You cannot imagine how this animal (I ask pardon of the King of Siam for the expression) was fondled and feasted. The population of the villages made plain the path, swept it, made bridges to prevent his taking cold from wetting his feet, constructed elegant stables for his reception; and message after message arrived from the king recommending them not to travel too fast, in case of fatiguing him. But, alas! all these attentions were the cause of his death; the animal, still in a wild state, would willingly have exchanged all these honours for a little liberty, and the delicacies with which they regaled him for a few loads of fresh grass. All went on well as far as Saraburi, where, to please his Majesty, they gave him such a quantity of sweetmeats and pastry that he lost his appetite, began to swell, and died before he reached Ayuthia.

I now return again to Chaiapume. As I have already told you, this time I had letters from all the Laotian authorities; the best one cost me a gun, worth 3 or 4 francs. None of them, however, were of any use, except that which I obtained at Korat. The governor was obliged to grant me all I required, and his assistants trembled at my orders. The people, as before, showed me every kindness, and after entertaining me three days I set out with elephants. The same chain of mountains which forms the borders of the Menamlae, in the province of Saraburi, stretches on the one side to the southern extremity of the peninsula, running entirely through it; the other surrounds Cambodia as it were by a girdle on all sides of the gulf, and forms a hundred islands. An accessory chain runs directly north, enlarging and extending to the east its longifications, which form a thousand narrow valleys, emptying their waters into the Me-kon.

On my second entry into Dong Phya Phai the rain had commenced, and I was drenched by a most fearful deluge. The rain continued with occasional intervals of a few days; but this did not stop me, though I had to traverse a region still more feared by the Siamese than the Forest of the King of Fire, and where none of them willingly consent to go.

In this mountainous country only elephants are used in travelling; every village contains a certain number, several small towns from 50 to 1000. I would willingly call them the frigates of the jungle and the tropical mountains: without them no communication would be possible during seven months of the year; there is no part, however fearful, which you cannot pass by their assistance. It is quite impossible for me to give you an idea of the roads, consisting of ravines, ruts of 2 and 3 feet deep, full of mud, at times causing the elephants, with their feet brought together, to slip upon the soft clayey soil of the steep declivities; then plunged up to their

middle in mire; shortly after upon pointed rocks, where one would imagine only a rope-dancer could disengage himself; going over enormous trunks of trees, breaking down the young trees and bamboos which oppose their passage; lying down so as to aid the cornacs in placing the packsaddles; sounding with their trunks for the depth of the water and the mud, so as to ensure their passage; always stamping and raising themselves without stumbling or making a single false step. One must see the elephant at work in his own country in his savage state, to have an idea of his intelligence, of his strength, his docility, and his activity, and of the admirable manner in which he brings into action all his articulations, of which we have for a long time considered him deficient; and find that he is not what we would consider him—a rough sketch of Nature—an animal created to confound men's imagination, but one of supreme perfection, intelligence, goodness, and foresight. We must not, however, exaggerate his usefulness; the packsaddles of the Siamese are also wanting in perfection: but the load of three small buffaloes, from 250 to 300 lbs., is as much as I have seen the largest elephant transport with ease in the plain, as well as in the mountains, and 18 miles the greatest distance he can travel with ease; with a moderate burden, 9 or 12 miles being the usual day's work. A short time ago with 5, 6, and at times 7 elephants, I traversed that sea of mountains, and, from entering the state of Lao until my arrival at Louang Prabang, I have not ceased to climb and to descend a distance of nearly 500 miles.

All this eastern part (with the exception of two or three savage villages and black-bellied Laotians enclosed in this state) is inhabited by the Laos, or Laotian White-bellies, who call themselves Lao, and whom all the Chinese, Siamese, and other surrounding people, only know by this name.

The Black-bellies, or Western Laos, are called by their brethren of the East by the name which at Siam and Cambodia they give to the Annamites—Juene, Lao-Juène. The only thing which distinguishes them is that they tattoo the under part of the body, principally the thighs, and frequently wear their hair long, knotted upon the top of their heads. Their language is nearly the same, and differs little from the Siamese and Eastern Laos, except in the pronunciation, and contains expressions no longer in use among the former.

I soon found that, but for the letter I received from the Governor of Korat, I should have had much difficulty with all the chiefs; but it seemed now quite understood that wherever I passed I was to be provided with elephants, and lodged like a prince; and some small presents given to a few, and a small recompence to the cornacs, drew to me quickly the sympathy of the people. Most of

the villages are situated at about a day's journey from each other. You have frequently, however, to travel three or four days without seeing a single habitation. You have, then, no alternative but to sleep in the jungle. During the good season it is charming, but during the rainy season nothing can give you an idea of the suffering which travellers support during the night under a poor shelter of leaves, hastily raised above a bed of branches, assailed on one side by myriads of musquitoes, then the ox-flies (taous), which at sunset, as though mounting upon an animal, attack man as well as elephants; small and almost imperceptible fleas surround you in swarms, the bite of which, being excessively painful, causes enormous blisters; then leeches, which on the smallest wound smell man's blood at the distance of 20 steps, come out of the ground on all sides with wonderful avidity to suck your blood. To cover the legs with a layer of lime is the only means to prevent them from covering your body when travelling; and you cannot go 20 paces into rather a thick forest without having very soon at least 20 upon your feet hard at work.

On the 12th of April I quitted Ban-kok, and on the 16th of May I arrived at Leuye, chief town of a district, rising at once out of two provinces, Phetchaboune and Lome, situated in a narrow valley, like all the towns and villages through which I have passed since I left Chaipume. This is decidedly the richest district of Siam in minerals; one of its mountains contains immense beds of magnetic iron, of an admirable quality, others antimony, copper, *argentifere*, and tin. The iron only is explored; and this small population—one half agriculturist, the other artisans—furnish with spades and cutlasses all the surrounding provinces, even beyond Korat. At the same time they have neither foundries nor steam chimneys. I have seen a space of more than 150 miles containing iron of choice qualities; but this part only (as one may easily conceive) can be explored by the natives with the simple means they possess. I have seen auriferous sand in several localities, but not in abundance; in some of the villages the inhabitants collect gold, but they informed me that they scarcely gained sufficient to pay them. I have found no *zetic* anywhere, and *lienz* is only to be found in the basin of the Me-kon.

During this journey I have passed through more than sixty villages, containing from twenty to fifty fires, and six boroughs called towns, having a population of from 400 to 600 inhabitants. I have made a map of all this part of the country. Unhappily the greater part of my instruments are now useless: thermometer, watch, barometer, and my other instruments, all got broken during the painful journey over the mountains.

Since leaving Korat I have crossed five large rivers which fall

into the Me-kon, the beds of which are more or less filled according to the season of the year. The first is 35 yards wide, called the Menam Chie, lat. $15^{\circ} 45'$; the second, the Menam Leuge, 90 yards, lat. $18^{\circ} 3'$; third, the Menam Ouan at Kenne Thuo, 100 yards wide, lat. $18^{\circ} 35'$; the Nam Pouye, 60 yards wide, lat. 19° ; the Nam Houn, 80 or 100 yards wide, lat. 20° . The Chie is navigable from the latitude of Korat to its mouth from May to December; the Leuge, the Ouan, and the Houn are only navigable for a very short distance on account of their numerous rapids; neither does there exist any communication by water between the Me-kon and the Menam in Lao, or in Cambodia. The immense heights which separate them are here as it were insurmountable obstacles for cutting canals, so that it is upon false information that some geographers have made their maps. I refrain at present from counting the rivulets or the torrents which I have seen and heard roaring upon the rocks and in the vales which I have crossed; I have the names of about 50 which are never quite dry. The Laotians differ little from the Siamese, taking them all in all: the principal difference is that which distinguishes the people of the mountains from those of the plain, a difference in pronunciation; a slow and country-like accentuation also makes a difference in their language. The women wear their hair long, which when combed (but this does not often happen) makes the young ones look more interesting than those on the borders of the Menam; they also wear a petticoat. The old women, however, with their horrible chignon thrown on in the most negligent manner upon one temple or the other, and with fearfully large wens, appear more like witches than women. I looked in vain for that simplicity spoken of, or something more interesting. I have generally found the Siamese more frank, more generous, more confiding, and even more hospitable.

A more enterprising and adventurous spirit, however, characterises the Laotian: a love of gain pushes him on to work, and especially to traffic. The Siamese, bowed down by misery, never seeks to acquire anything, in case of being altogether dispossessed: the Laotian, who, from policy, is governed with more humanity, is ready with his elephant or his pirogue (boat) to go anywhere when he expects a recompence; he is composed of good stuff, and will go with you from the borders of the Me-kon to Nane, Lome, Chiang Mai, and even to Moulmein. Able administrators would derive much from him; whilst from the Siamese they would obtain nothing more than rice without much difficulty.

The commerce of this part of Lao is inconsiderable; the Chinese from Siam being unable to penetrate hither on account of the enormous expense it would cause them to transport their

merchandise on elephants. Once a year a caravan arrives from Yunnan and Quangsee, composed of about 100 inhabitants and some hundreds of mules; some proceed as far as Kenne Thao; others reach Mount Nane and Chiang Mai. They arrive in February, and leave in March or April: for the last two years, however, they have ceased coming; and it is thought here that it is on account of the troubles and massacres which have broken out among the Lu, a Laotian colony, nearly in a savage state, which must be traversed before reaching China. Others suppose that the traders who have been in the habit of coming have been murdered on the way by the plunderers of this tribe. I am inclined to believe all their reports false, and think that the Chinese rebels have either plundered them or prevented their setting out. The mulberry-tree is not found in these mountains; but in some localities, where they raise a quantity of insects producing the laque or Chinese varnish, they cultivate a shrub the leaves of which serve them for food.

All the gum benzoin or benjamin which is sold at Ban-kok is procured from the northern extremity of the principality of Louang Prabang, a district tributary to Cochin China, as well as Siam, inhabited by a people rather Tonquinese than Laotian. The prince who governs the state of Louang Prabang pays his tribute to the King of Siam, principally in gum benzoin; the Annamites in their turn do the same. This is all I can tell you at present of this valuable resin.

On the 24th of June I arrived at Paklaie, lat. $19^{\circ} 16' 58''$, the first small town which you reach on coming from the south; it is the most beautiful little town I have yet seen in this country. It is situated on the Me-kon; the houses are beautiful, spacious, showing much more ease and comfort than any I have seen in this locality. The Me-kon is there much wider than the Menam at Ban-kok, and, with a noise similar to that of the sea, and the impetuosity of a torrent, it forces its passage between the high mountains, which seem scarcely able to keep it within its bed. The rapids succeed each other at nearly a mile distance, from Paklaie to Louang Prabang, which you reach after ten or fifteen days' painful journey. I was tired of travelling with elephants, and wished to have a boat; but the chief and the inhabitants of the village, fearing an accident, preferred conducting me by the elephants. I therefore continued my route as far as Thadua, 90 miles farther north; and during eight days I passed as formerly from valley to valley, crossing the mountains, which became higher and higher, and where we were most severely treated by the leeches, but no longer obliged to sleep in the jungle, as every evening brought us to a hamlet or a village, where we found either a caravan or a pagoda.

From the mountains of Dong Phya Phai, until here, I have observed that all the inhabitants who drink the water of the rivulets running from the mountains are disfigured by enormous wens: the men frequently escape, but the women are all disfigured by them; even girls of eight or nine years old have wens as large as an egg. I have passed through only one village where tigers commit great ravages; a female had been killed, but the male still remained in the neighbourhood, and in the space of three months had devoured fifteen buffaloes and three men. The greatest danger one runs in traversing these vast forests and these steep declivities is, that there are usually to be found among the elephants of the caravan one or two females, followed by their young, running about like goats, eating a little here and a little there, and their feet wanting in firmness causes one at times to fall into a ravine; in a moment the whole troop throw themselves over after him, when men, merchandise, and all are precipitated to the bottom and broken in their fall. The only accident which happened to myself was when one of my elephants rolled down upon the rocks with his pack-saddle on his back, and broke in pieces my instruments and other objects, at the same time throwing his cornac a distance of 16 steps; those of others, seized with fear on hearing the trot of a pony behind them, took fright, running with a velocity of which I could have never believed those animals capable, and roaring in the most tremendous manner—shaking me almost to pieces, and breaking a quantity of fragile objects. Since then I have had no other torments, except that of having my two poor men attacked with fever.

The shortest and easiest road to travel to Ban-kok from this state is by Phixaie. After having reached Paklaie, seven or eight days' march brings you to the first of those towns situated upon the Menam. There you take a boat; and, when the waters are large and the current strong at certain epochs, in less than fifteen days they will row you to Ban-kok. I now reached Thadua, where for want of elephants I was obliged to take a boat: there only remained three days' journey, and only four or five rapids to pass, not so dangerous as those farther south, but sufficient to convince me that, far from having exaggerated the difficulties and dangers of the navigation, they had only given me a feeble idea of them. I think I remember, in a letter which I addressed to you on the "Stien savages," from Cambodia, having described this river as imposing but monotonous, and not in the least picturesque: here the difference is very great; in its narrowest parts it is more than 1000 yards wide, everywhere banked up by high mountains, from which torrents fall, and from cascade to cascade bring to it their tribute. I find the spectacle too grand, or, as you may say, too constantly grand. You are also kept in continual emotion on going over the

rapids; one's life seems to hang by a thread. The embarcation is drawn along from the banks by means of a cord, this being the only way to vanquish the extraordinary force of the current: were this cord to break, your boat would in a moment be inevitably broken to pieces; you would be carried away by the current and swallowed up in a vortex. A certain number of accidents happen every year: it is only during the months of August, September, and October, that the rocks are quite covered with water; but this does not prevent those who live on the borders of the river from venturing from one part to another, when their trading requires it.

The Laotians of this part are cool and resolute; much more so than upon their elephants on the mountain, where a child might lead them. The Laotian is well known upon those untamable waters, which would astonish even an old sailor; he braves them daily with as much calm as though they smiled upon him. On the 25th of July I arrived at Louang Prabang, a charming little town, standing on a square mile, containing a population, not of 80,000, as Bishop Pallegoix says in his work on Siam, but of 7000 or 8000 at most. Its situation is one of the most agreeable; the mountains which inclose the Me-kon above and below this town form here a kind of circular valley, a sort of amphitheatre 9 miles wide, which must formerly have been a lake, and contribute to form a delightful view, reminding one of the Lake of Como or Geneva: but for the sun of the torrid zone, or a breeze to diminish the heat of the day, this would be a little paradise. The town itself is constructed on each side of the river, though on the right bank there are but few habitations; the most considerable part of the town surrounds an isolated mount, more than 100 yards high, and which a courageous, intelligent, and energetic people, like the Cochin Chinese, would have converted into a citadel, which would prevent the capital from being attacked by their neighbours. A pagoda is all they have thought of constructing on its summit; so that, but for a little fear on the part of the Siamese, and the mountains covered with jungle to traverse, this principality would soon fall into the hands of the Annamites, who are only at the distance of seven days' journey to the east. A charming river, 100 yards wide, joins the great river, on the north-east of the town; flowing near some Laotian and savage villages, here called Fie. These are no other than the tribes called Penons by the Cambodians, Khu by the Siamese, and Moi by the Annamites: names having no other signification than that of savages. The whole chain of mountains which extends from the north of Tonquin to the south of Cochin China, 100 miles to the mouth of Saigon, is inhabited by this primitive people, quite in a savage state, divided into tribes speaking different dialects, but whose manners and

customs are the same. Their habitations are in the thickest parts of the forests, where they only could make a passage, and where they do not allow any path to be observed; their cultivated ground is to be seen on the sides and on the summits of the mountain: in a word, they employ the same means as animals to escape from their enemies and to preserve their liberty and independence, which they consider their supreme good. All the villages near the Me-kon are tributary; those nearest to the town work at the constructions for the King and princes, and have heavy taxes to pay; others pay their tribute in rice.

Yesterday I was presented to the King, who received me with a great display of pomp and splendour; he was surrounded by mandarins and ill-clad guards. His Majesty sat upon a kind of sofa-throne, chewing the betel-nut, and making all sorts of grimaces. During the space of an hour he uttered about twenty words, which were to ask me a few questions. I could not get off giving him one of my guns; and, after having received a cup of tea from his ruminating Majesty, I took my departure, having obtained, however, the permission to circulate wherever I should think proper. The second prince recommended me not to go out of the town, assuring me that the woods were full of demons: he advised me to make a list of the objects I desired, and to present it to the senate, who would try to procure them for me. The prince also evidently wished to receive a present.

I have collected in some good localities about 2500 insects, which will not fail to please you and rejoice your numerous friends, consisting of magnificent puprests, such as I have sought for in vain in Siam and Cambodia, longicorn, and a quantity of carabi mostly new, and of an extraordinary beauty, and some good land-shells; but as yet nothing so fine as the *Helix Manhuti* or the *Bulim* of Cambodia.

I wish to be of some service to the Societies more than to myself personally. You may well imagine that it is not the love of gain which urges me on in my researches; it is not for money that I would expose my life in those unhealthy climates, where, at almost every step you take, death stares you in the face, or support patiently misery and trouble of every description.*

I am, dear Sir, &c.

* M. Mouhot died at Louang Prabang on the 10th November, 1861.—Ed.

XIV.—*Journal of a Tour to Karen-ni, for the purpose of opening a Trading-Road to the Shan Traders from Mobyay and the adjacent Shan States, through that Territory, direct to Tungu.*
By EDWARD O'RILEY, Esq., F.G.S., &c. *With Notes.*

Read, March 10, 1862.

Nov. 6, 1856.—Having concluded my arrangements for carrying out the instructions of the Commissioner of Pegu with reference to proceeding to Karen-ni, by a road to be opened through the Pong Loun Ranges, to the eastward of Tungu, by which the Shan traders from Mobyay, Monay, Mokemai, and the other contiguous Shan States, will be enabled to bring their trade direct to Tungu (¹), I despatched the elephants and baggage to the west landing-place at Myo Gyee, about 2 miles below the city, and proceeded by boat to that point, thence by the brick pathway to the Myat-tsau-ni-nung Pagodas, where I halted to make arrangements with the Karens of "H'ton-h'po" to clear and widen the road to their location in a north-east direction into the Pong Loun ranges.

Our party consists of four commissariat elephants with their attendants, ten armed Burmans, who have been instructed in tent-pitching, the two Karen Na-Khans (²), (Moung Quay Luy and Moung-Hpo,) Oo-twai, the blood-sucker (³), and two poens, the Myo-Oke of Bommodee (Oo-Moung), who accompanies us to the eastern border of his district, and a few hired coolies (Burmese):—

Course from Myo-Gyee . . .	E.S.E.
Distance *	3½ miles.

Nov. 7.—The Karens of H'ton-h'po, having been employed on the road for the last week, report it completed to the Karen village to the eastward of their own.

Started from the Pagodas; at half a mile north-east crossed the Pyoon-Khyoung, falling into the Thouk-yai-khat-Khyoung to the south.

At 2½ miles crossed the Kyet-thoung-Khyoung, } feeders of the
At 4½ miles crossed the Kyouk-pa-te-Khyoung, } Thouk-yai-khat.

Halted at the Karen village of H'ton-h'po, on the east of the stream.

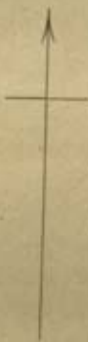
Course N.E.—estimated distance 4 miles.

The last 2 miles over low hills forming the base of the lateral spurs from the higher ranges, the formation being uniformly quartzose sandstone, laterite, and granite (porphyritic), all in fragmentary masses.

* The distances were taken by a perambulator, and, an allowance being made for altitude, the result is given as the estimated distance.

A horizontal scale bar labeled "English Miles" with markings at 0, 10, and 20.

Mr O'Hiley's Route to Coloured



S H A N S T A T E S

Merkmal

2. Мобильный

Extensive Plains

K A R E N N I

Ngwai Tsiming - a Shan Town
on the border - Road of Hsiao Fu Tse

Noumea-Bellevue - Residence of

Young Bela - Residence of
 Eszter Nagy - Dec 29, 1956 & Jan. 3, 1957.

THE HON. MR. SPEAKER: Chief of the Western Service.

R. Salween

Kyot-taiki

TOUNGU

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Paid the Karens employed on the road to this village (62 men): each received one rupee and a gOUNG-bOUNG (muslin turban), with which they appear to be highly satisfied.

Thermometer 6 A.M. 57° ; do. 6 P.M. 73° .

Nov. 8.—After leaving halting-place, at a quarter of a mile recrossed the Kyouk-pa-te-Khyoung and proceeded up its course through a deep alluvial valley, forming the old clearings of the Karens of H'ton-h'po.

At $4\frac{1}{2}$ miles crossed the Koon-Khyoung, an affluent of the Thouk-yai-khat, thence across a series of low hills to halting-place at the juncture of two mountain-streams called "Khyoung-h'neel-gwa." The road since leaving the valley of the Kyouk-pa-te across hills of higher altitude than those of yesterday, a considerable distance being up the water-courses, the base affording no space for a road.

Course nearly E.N.E.—estimated distance $4\frac{3}{4}$ miles.

Thermometer 6 A.M. 54° ; do. 6 P.M. 72° .

Sunday, Nov. 9.—Remained at halting-place. The Karens from H'ton-h'po, who have accompanied us, are Christians of the Baptist Mission, and they, with a number of Karens from the next Christian village of Bah-mo, have assembled here for the performance of the Sabbath service—a Karen teacher from the latter village presiding as minister. Divine worship performed three times during the day.

Nov. 10.—From halting-place passed up the bed of the stream for a quarter of a mile, thence up the steep face of one of the series of lateral spurs abutting on the main ranges, from the top of which, at an altitude of about 1600 feet, the valley of the Sitang was visible, the Toungu Pagoda bearing due west. Course along the ridge, and descended to the Hun-ga-louk-Khyoung, a mountain-stream running south into the Thouk-yai-khat.

Course E.N.E.—estimated distance $2\frac{1}{2}$ miles.

Many parts of the road to-day passing along the steep side of the hills, with foot-space barely sufficient for the elephants: it was necessary to halt frequently to scarp the bank to a sufficient width to allow the elephants to pass freely, and thus provide a passage for loaded bullocks.

Nov. 11.—One of the elephants, having been scared during the night by a tiger, broke away from his chain and escaped into the thick jungle of the lower valley. At daylight sent two of the elephants in search of him, and was detained until near noon before they returned with the stray one: loaded the elephants and started. The road from halting-place up a moderately steep ascent of about 2000 feet, and thence along the ridge, from the top of which the valley of the Sitang lay open to the view, Toungu bearing a little to the south of west—the whole of the hill series to

the westward, which separate the Sitang from the valley of the Irrawaddy, more visible from this point, forming a magnificent panoramic scene. Descended to the base of the lower ranges and along their flanks to halting-place at the Karen village of "The-yai-yo," on a fine mountain-stream, the "Mai-ga-thoung," running south-east into the Thouk-yai-khat.

Course E.N.E.—estimated distance 2 miles.

This is a Christian village of the American Baptist Mission, with a population of 218 souls: it has a chapel and a Karen teacher (De-tipo), who resides here. The situation of this village is exceedingly beautiful; the mountains which almost surround it rise from the platform on which the village stands, to a height of from 2000 to 2500 feet, forming a natural amphitheatre of the grandest dimensions. The surrounding hill-sides have been converted into "Toung-yas" (upland cultivation), and only in patches on the mountain-tops and in the gorges down which the stream courses, amongst huge granite-boulders, is any of the primeval forest visible; and this, interspersed with clumps of the arca-palm, planted by the Karens near the water-courses, completes a picture of wild and solemn beauty.

The Tsan-kai (Karen chief) of the village of Kyet-Teik, situated at a distance of a day's journey to the north, came to the camp to-day and stated that the whole of the village had been destroyed by fire from accident, that two men who were sick had perished in the flames, and others were badly scorched. The whole of the community, consisting of seventy-one families, having lost their paddy and all other articles of subsistence, were thus rendered destitute and incapable of meeting the payment of Government tax, from which they prayed to be released: their petition was accordingly granted, and a small sum given to each family to enable them to provide present means of subsistence (*).

Nov. 12.—The road from the village of The-yai-yo had been cut by the Karens up the steep face of the mountain, instead of along the flank at a more easy ascent, so that the elephants had a very laborious task to reach the summit at a height of about 800 feet. The road being too steep to admit of laden cattle proceeding by it, I requested the Eing Thoogyee to open one of easier ascent, which he promised to have ready before I return, that across the hill having been cut without a knowledge of the purpose for which it is required.

Proceeded along the ridge and descended its northern side. At $1\frac{1}{2}$ mile crossed the Kyouk-ta-da mountain-stream, a feeder of the "Thouk-yai-khat," thence through the Karen cultivations of "Mai-ga-doong," to the village on the mountain-stream of that name which drains the hills of this locality and falls into the Thouk-yai-khat.

Course E.N.E.—estimated distance $2\frac{1}{2}$ miles.

This is also a Christian village, with a community larger than that of "The-yai-yo:" it possesses a chapel and school, over which a Karen teacher of the Baptist Mission presides.

Nov. 13.—The road from this point eastward is not yet opened; to effect which and carry it on continuously through the locations of the "Yaings," it is necessary to collect the several chiefs of the tribes and make them understand the object. I have accordingly despatched messengers and Oo-twai with presents to each of them, desiring them to meet me at this place. Shifted my tent to the top of a hill to the eastward, and found the altitude by the boiling-point to be 2794 feet.

Thermometer 6 A.M. 65° ; 1 P.M. 84° ; 6 P.M. 73° .

Nov. 14.—Thermometer 6 A.M. 63° ; 1 P.M. 82° ; 6 P.M. 75° .

Several heavy showers during the day.

Nov. 15.—Thermometer 6 A.M. 67° ; 1 P.M. 85° ; 6 P.M. 73° .

The chiefs of the tribes of the Ley-pya-gyee and Ley-pya-ngay arrived in camp to-day from their locations in the higher ranges to the north-east; they belong to a separate section of these Karen tribes, and call themselves Pway-kau-tah. In appearance they are more robust and better made than the Karens of this locality; their language is a dialect of the generic form of that in use throughout the whole of the tribes. In dress they also differ, wearing a short pair of drawers reaching half-way down the thigh instead of the tunic, the single covering of the tribes nearer the valley of the Sitang: from this peculiarity of dress they are styled "trouser-wearing" Karens by the Burmese.

I was a good deal surprised at the visit of these chiefs, because about four months ago a report was made to me of their having seized a man of this tribe, Mai-ga-doong, whom they refused to restore unless redeemed by the payment of five kye-dzeis ($^{\circ}$), (a form of brass gong made by the Shans). A message from me that they should restore the man and prefer any complaint they had to make to myself, had also failed in effect; and I was told that they were opposed to my making a road in their locality, and would prevent it. Expecting to have encountered some opposition from these chiefs, I was agreeably surprised to find them at my tent uninvited; and on bringing the matter of the seizure and detention of the man of this tribe before them, they acknowledged its truth, stating that he was detained for the payment of a debt of two kye-dzeis due to them from the people of Mai-ga-doong, and that, owing to the long period since it was incurred, upwards of thirty years ago, they demanded five kye-dzeis for his release. I then informed them of our law and system of administering justice, by which they had no right to seize the body or property of any man, and that their complaints, of whatever nature, would

be attended to if made through the proper channel, or to myself personally. They declared that they had not treated my message as represented, but that the man who brought it behaved in so arrogant a manner that they refused to listen to him; that, hearing of my intention to proceed into the hills, they had waited for the opportunity to come and receive my orders in person; and finally, that, if I so desired it, they would at once restore the man to his tribe. With regard to the road, they informed me that beyond their own locality it was too difficult for elephants to pass, and that scarcely a single man of their tribe had gone across the highest range, fearing to be caught by the Yaings of those mountains, who seize and sell into slavery all persons of other tribes they can lay hold of; they promised to restore the man at once, and to search for a passage through the high range, and, if found, will meet me on the Thouk-yai-khat stream and show me the road. Having evinced so good a disposition, I made each a present, with something additional to the chiefs, and they returned to their village rejoicing.

Sunday, Nov. 16.—Thermometer 6 A.M. 56°; 1 P.M. 80°; 6 P.M. 74°.

Several chiefs of "Yaings," from the north-east, arrived during the day, who, with the people accompanying them, appeared to be much interested in the performance of Divine worship by the Maiga-doong people. The Scripture being read by the teacher in the "Sgau-Karen" dialect, I inquired of several of the Yaings whether they understood it. They replied that many of the words were similar to their own language; that they were ignorant of the general import of what they heard; but that they would be glad to be taught to read in their own tongue, that they might become like those who had professed Christianity.

Nov. 17.—Thermometer 6 A.M. 67°; 1 P.M. 85°; 6 P.M. 76°.

The whole of the Karens who came in yesterday assembled at my tent, and I explained to them the object of my presence in the mountains: they expressed great pleasure at my coming, and intimated their willingness to open a road through their hills, and that they would return and await my arrival before commencing it, lest they made it in a wrong direction, or up too steep an acclivity for the elephants. My stock of cotton-goods having been nearly expended in payment to the road-makers to this place, I was compelled to dismiss the people to their villages, with a promise of payment and presents on my arrival among them.

Made payment to the Karens employed in opening the road from Hun-galouk-khyoung to this place—162 men—each receiving a rupee and a goun-g-boung.

Nov. 18.—Previous to starting for their village, the chiefs of Ley-pya-gyee (*) and Ley-pya-ngay requested that Oo-twai should

accompany them to a village of the "Yaings," at a day's journey in the mountains to the northward, where two men of their tribe had been detained for upwards of a year. Their request was granted, and Oo-twai was despatched with some presents and a small sum of money to induce the "Yaings" to restore the men and accompany him back to my camp.

The Na-Khau-Quay-lay, who accompanied the Yaings on their return to their homes yesterday, has sent in a party of "Bla-kyee" (Yaings from the high range of the Terapei-nye-noung) with a message stating that other tribes situated high up in the range could point out a road to be opened round the base of the mountains to the northward, but that they refused to meet him. He requests, therefore, that some presents of handkerchiefs, beads, and silver coin, be sent him to induce them to come in; which are accordingly sent. The road beyond the central range is reported to be less difficult than that from Toungu to this, being probably the higher plateau of the table-land of Karen-ni.

Thermometer 6 A.M. 65°; 1 P.M. 84°; 6 P.M. 73°.

Nov. 19.—The Eeng-thai-gyee, with a few of the head men of the Karens of "Pa-way," at the source of the Thouk-yai-khat-khyoung, in the direction of the intended road, arrived at the camp: they belong to the Pagoh, or "Yaings." They complain of an attack having been made upon their village by people from eight villages of their own class, five days ago. The chief informs me that these people are the wildest and most intractable of the whole of the Karen races, and are the dread not only of his own people, who are of the same tribe, but of all the surrounding clans as far as Karen-ni; that before attacking his village they sent a message to him, inviting him to join them in an attack upon myself and party when approaching their locations, stating that I had brought a large amount of gold and silver, with other valuable property, which would be divided amongst the attacking party: to this proposal he would not consent, and has come in to warn me of the intentions of these people. These villages three years ago attacked the Shan traders when attempting the passage to Toungu through their locations, killed a number of the men, and dispersed their bullocks and ponies, some of which are said still to be seen in the less-frequented part of the valleys of the central high ranges. It is said that they obtained a large amount of plunder on that occasion. After taking down the chief's statement in Burmese, I sent him back to his village, giving to himself and companions a present each of a red turban and half a rupee. I requested him to let the turbulent portions of his tribe know that my intentions were peaceful and tended to confer a benefit upon them, as those of the Yaings who had come to my camp could testify; that I had heard of their wicked intentions towards me, and was fully prepared

to receive them in the character of robbers and murderers; and that on the first demonstration of hostility towards myself and party I would inflict a punishment upon them that should strike with terror the hearts of all their tribe.

Under the Burman Government these tribes of the Pagoh section of the Yaings were never subdued, refusing on all occasions the payment of tribute of every kind, and not infrequently putting to death any Burman petty official who had the temerity to approach their locations; nor is this to be wondered at when it is remembered that the Burman Government was known to these wild races only as a remorseless tyranny, from which, as opportunity offered, they experienced acts of the most cold-blooded atrocity. Without a personal knowledge of us, it is but reasonable, therefore, that these poor wretches should still entertain the same opinion of the dominant power, and it therefore becomes a duty of mercy to exercise a forbearance towards them and propitiate them with acts of kindness, that their ignorance be removed.

Having only ten muskets with me, I have deemed it prudent, however, to send for an additional twenty stand of arms; a volley from which, should circumstances demand it, will disperse all the tribes of Yaings that may be within sound of it.

Thermometer 6 A.M. 64° ; 1 P.M. 86° ; 6 P.M. 73° ; with dense fog up to 10 A.M.

Nov. 20.—Ascended the range of hills to the west of the camp for the purpose of taking a bearing of Toungu. After a most tiresome and difficult ascent of two hours, owing to the steepness of the path, reached the summit, which gave an altitude by the boiling-point of 4132 feet. From this point only a portion of the Sitang valley south of Toungu was visible; a still higher range intervening in the direction of Toungu, which, from known localities within view, was estimated to bear about west by south from my position.

Looking eastward the scene was exceedingly grand and imposing; the main ranges of the Poug Loung, at a distance of 12 to 15 miles, forming a complete barrier to the outline in that direction, while the lower hills at the altitude of my camp rise abruptly in the wildest confusion without any general direction, upon which several Karen villages are seen, each possessing a well-defined area of Toung-ya cultivation.

Thermometer 6 A.M. 62° ; 1 P.M. 83° ; 6 P.M. 75° .

Nov. 21.—The Karen messengers returned from Toungu with despatches, &c., received by the mail. Several head men of villages to the south came in, requesting remissions of their tax on account of individuals who are sick and otherwise incapacitated from labour, which was granted. A general request for medicines was made; but, having brought only a small stock of febrifuge

medicines for my own party, I was unable to attend to their requisitions.

Thermometer 6 A.M. 60°; 1 P.M. 81°; 6 P.M. 73°.

Nov. 22.—The old Shan (Oo-myat), who left Toungu upwards of a month ago for the purpose of tracing the line of road through the eastern Karen locations, and for whose safety I entertained strong fears, returned to-day to camp accompanied by Kwoon Tee, the son of the chief of Karen-ni, and eight other chiefs of tribes of the Yaings east of the Yo-mah (*), through whose country the road will pass. They all expressed their willingness to open the road, but require an advance of 100 rupees each and a portion of cotton-goods to distribute amongst their people: this, as simplifying the work, I have consented to; at the same time instructing them to carry the line at the lowest and easiest levels round the base instead of across the high ranges, which they have promised to attend to. These chiefs are in some measure subject to the influence of Kyay-h'po-gye,* to whom, however, they pay no tax, but acknowledge his authority merely: they express their gratification at my passage through their country, and state that they will keep the road permanently open, and afford every assistance to the Shan traders who may proceed by it to Toungu. For their ready acquiescence in my plans I have given to each a present of red cloth.

A number of Red Karens have accompanied the chief's son; but in appearance they resemble the Yaing tribes so exactly that I conclude them to be of the same race, although I am informed that their language differs materially.

Thermometer 6 A.M. 64°; 1 P.M. 85°; 6 P.M. 76°.

Sunday, Nov. 23.—Sent in an elephant to Toungu with despatches, and for the purpose of obtaining additional supplies to enable me to proceed to "Karen-ni."

The Karen Missionary, San Qua-lah, arrived at this place two days ago, and presides over the Sabbath service, the whole of the community (adults) being converts to his faith (Am. Baptist).

Thermometer 6 A.M. 64°; 1 P.M. 81°; 6 P.M. 72°.

Nov. 24.—Kwoon Tee, son of the chief of the Red Karens, with eight chiefs of the Yaings who have accompanied him, returned to their villages this morning. They will search for the easiest points of passage across the Yo-mah; and on my arriving at their villages, should I approve of the line, they will assemble the whole of their people and open the roads. Arranged with the Yaing chiefs to advance to each 120 rupees and a portion of cotton-goods, to complete a road through their several locations eastward of the Yo-mah; the distance being computed at 20 teings, or 40

* Chief of the Red Karens.

miles. Intend moving camp to-morrow along the road completed to the Thouk-yai-khat-khyoung, where other chiefs of the Yaings purpose meeting me. Engaged a number of the Karens of this village, Mai-ga-doong, to carry the portion of the baggage which forms the load of the elephant sent to Toungu.

Two of the Karen Na-khan's people, from the village of Banga-le, attacked with small-pox, and one of the Red Karen Yaing chiefs suffering from a severe attack of fever; gave them some medicine, adapted to their respective ailments, and sent them back to their houses.

Thermometer 6 A.M. 62° ; 1 P.M. 78° ; 6 P.M. 68° .

A lower range of the temperature, in consequence of the setting in of the north-east wind.

Nov. 25.—Crossed the Mega-doo-khyoung at the base of the hill (camp)—course over several low ridges to the "Pa-ee-loo" Khyoung at $2\frac{1}{2}$ miles from the halting-place (a feeder of the Thouk-yai-khat).

That stream forms the boundary between the locations of Mounng Dine and Mai-go-doo ($^{\circ}$): the latter part of the road, across a high range of 2200 feet, to halting-place at its base on the Thouk-yai-khat-khyoung. The stream which receives the drainage of the subordinate ranges, west of the Yo-mah, is at this point about 35 yards broad (with deep pools and rocky overfalls), running at the rate of $3\frac{1}{4}$ miles per hour: height per boiling-point 2347 feet above the level of the sea. The hills on both sides steep to the water's edge.

Halting-place near the Karen (Christian) village of Lay-mun, numbering above 120 souls; course E.N.E.; estimated distance $4\frac{1}{2}$ miles.

The route during this day's march lay directly across ridges of hills of varying altitude, excessively steep in some places; the difference of altitude passed being as high as 3200 feet.

Nov. 26.—Swam the elephants and ponies across the stream, and passed it over a bamboo floating-bridge. Road directly up the steep face of the hills on the east bank to a high range, showing an altitude per boiling-point on the ridges of 4675 feet; descended to halting-place on the Koo Lhoo Khyoung running into the Thouk-yai-khat-khyoung at a Karen (Christian) village (Leh-khoo), with a population of 130 souls. A Karen teacher of the American Baptist Mission resides here.

Course E.N.E.—estimated distance $3\frac{1}{2}$ miles; height of stream at halting-place 2231 feet.

The road, similar to that of yesterday, has been cut in almost a direct line by the Karens, without reference to any facilities for turning it along the flanks of the hills. They know of no other process, they say—a most convenient ignorance for them, as the

forming a pathway at lower elevations would incur the labour of scarping a portion of the hill-side, to which they are obstinately opposed; and there is therefore no help for it but to get the road opened under any circumstances and be thankful.

At the point of greatest elevation, looking down upon the valley of the Koo Lhoo, a most magnificent view lay open before us. To the eastward the high range of the Yo-mah and Pong Loun stretched along in an unbroken line from N.E. far to the south, with an altitude varying from 5000 to 8000 feet. Low on the flank of the main range a succession of elevations, without any general line of direction, and with boldly-defined rounded summits, filled up the whole space to the centre of the valley, through which the stream coursed, dashing in snowy wreaths over the falls seen at intervals in its broken bed; while the morning mists rising slowly from the valley, reflecting back the sun's rays, gave the appearance of an inlet from the sea, rendered more real by the tops of the lower congeries of hills rising above the stratum of cloud, like isolated islands from the ocean. Even the Karens of the party stopped in silent admiration at the scene, and while still gazing in abstracted wonderment, the sea of cloud was lifted up, obscuring from view the high ranges, but leaving the space below in the valley (about 20 miles broad) clear as the outline of a painted landscape; but all was silent—no wreaths of smoke to mark the village hamlet, no tall spire to consecrate the scene—one all-pervading tinge of green in varying shades, marking at distant points the clearings of the Yaings, contrasted with the forest vegetation of more sombre tint along the course of the stream and in the deep gorges of the more distant mountains.

The direction of the intended line of road across the main range was pointed out as crossing nearly the highest of the elevations to the eastward, but the Yaings of those mountains are as yet opposed to our passage.

Nov. 27.—In consequence of the difficult nature of the road from Mai-ga-doo to this place, have resolved upon remaining at present halting-place until the arrival of the elephant with supplies from Toungu. It is also desirable to induce some of the chiefs of the Yaings at the base of the central range to come into camp before proceeding through their cultivations against their will, for which purpose a few presents and a message by one of the chiefs of a village in that direction have been sent.

During the day a party arrived express from the chief of Karen-ni, bringing a letter from the agent stating that the frontier villages had been attacked by Shans and Burmese, and destroyed; supposed to be influenced by the Burmese officials at Mobyay in concert with Kyau-pu-tee and Tse-yee, the chiefs hostile to Kyay-h'po-gye.

Several Karen (Yaing) communities came in to-day to see me; they are of the same tribe as this village, but excessively filthy in appearance and dress.

Thermometer 6 A.M. 72° ; 1 P.M. 80° ; 6 P.M. 74° .

Showers of rain during the night.

Nov. 28.—Sent the Na-Khan Quay-lay, with two of the head men of this village (Lay-khoo), to proceed along the upper course of the stream in a northerly direction to endeavour to find a passage across the central elevation more accessible than that selected, which involves a considerable détour.

Proceeded to examine a "salt-lick" at some distance up the stream, the resort of numbers of deer and wild pigs, whose footmarks were abundant in the vicinity of the spring, which rises up through disrupted fragments of granitic and quartz formations. The whole surface is trodden into black mud, with small pools of clear water possessing a slightly chalybeate taste, but without smell or other peculiarity.

The Karens (dirty) of yesterday's arrival returned to their villages, promising to render every assistance to open a road in their direction, if found necessary. All complain of the conduct of the "Yaings" of the Yo-mah.

Thermometer 6 A.M. 68° ; 1 P.M. 79° ; 6 P.M. 72° .

Nov. 29.—Proceeded to the upper valley of this water-course (Koo Lhoo) to examine a deposit said by the Karens to be a portion of the mortar employed by the Burmese in former years in building a "pagodah" on a rising ground near the deposit, which, in the shape of a huge mound, remains to this day. Found the deposit in question to consist of a very friable and earthy calcareous "tufa" of very recent origin, mixed with much water-worn detritus and bearing the imprints of leaves, showing that the waters of the stream percolate a loose limestone formation at its source, which in losing its carbonic acid base forms calcareous beds in different parts of the stream.

The story of the "pagodah" a mere legend, the result of a fancied resemblance of the top of the mountain to a pagodah in ruins; nor is it probable that the Burmans, in any considerable body, could penetrate these mountain-ranges.

Thermometer 6 A.M. 54° ; 1 P.M. 78° ; 6 P.M. 73° .

Sunday, Nov. 30.—The Karen missionary, Qua-lah, performed Divine service, the whole of the Karens of the party and many of the villagers of Koo Lhoo attending.

Thermometer 6 A.M. 64° ; 1 P.M. 79° ; 6 P.M. 72° .

While the thermometer ranges at this period on the valley of the Sitang from 56° to 82° , the temperature here, even at this height, 2231 feet, is more equable with a higher minimum point, for the reason that the hills through which the stream flows form a complete

barrier to the north-easterly winds which prevail in their unobstructed course through the lower valleys.

Dec. 1.—The Na-Khan Quay-lay returned from his inspection of the country to the north-east. He reports that the Yaings, whose localities he reached, are the most wretched and debased of all the tribes in these ranges. On his arrival at their villages they refused to have any communication with him, and threatened to spear him if he attempted to enter their houses, which, unlike the rest of the Yaings, are built separately, one above the other, up the steepest part of the mountain sides; their objection being that he would cause sickness amongst them, and that I came to seize and make slaves of them. After some time, however, during which he explained the object of my visit and presented the chief men with a gounge-boung each, they consented to admit him into the village on the condition that he and party should eat separately. He learnt from them that a road existed in that direction into the Shan country, but not to Karen-ni. This road, in company with a guide from the village, he proceeded to inspect; and found that it skirted the main range northward, passing across the sources of the drainage, and was in some places so rocky as to be impracticable to the passage of beasts of burden. It was in one of these rocky passes that the Shan traders were attacked by these people, as previously noticed, when attempting to reach Toungu by this route; and they are under the impression that to revenge that affair is one of the reasons for my coming here.

The head men of the village would not consent to return with the Na-Khan to camp on any terms, but they permitted a number of the villagers, principally youth, to do so; and verily a more debased set of human specimens I never met with before. Even the Yaings who were present at my tent, whom I had previously classed as the filthiest of their kind, shrank involuntarily from contact with the new comers, whose scant clothing in rotten fragments scarcely sufficed for the purposes of decency; and there they sat, each representing an animated mass of the most grovelling debasement of the genus "*homo*." The Na-Khan said that in their homes they associated together like pigs and monkeys, but that the latter were the superior animals, because they rejected filth, which these creatures do not; they live in a constant state of dread of attack, and each man sleeps with his spear in his grasp. Even in their own clan, and in close proximity to each other's villages, this state of vigilance is observed. I caused it to be explained to them that henceforth a better state of things must prevail with them—that the past would be forgotten, and that they would be protected so long as they consented to forego their former practices, which, if repeated, would bring upon them a severe retribution. To each individual I gave a new gounge-boung and a silver 4-anna

piece, which, with the instruction they have received, I have no doubt will effect a better state of feeling with their chiefs on their arrival at their village.

Thermometer 6 A.M. 68°; 1 P.M. 79°; 6 P.M. 67°.

Dec. 2.—Oo-Moung, the Myo-oke, returned from Tounghu with the extra supplies and other articles as presents sent for from Mai-ga-doong. He reports that the Karens of Thge-yai-yo have opened the road by an easy line round the base of the hill, as directed.

The pioneer Oo-twai also returned to camp: he reports that, in company with several of the head men of the Karens of Ley-pyaygyee, he proceeded to a village of Yaings, at two days' journey in the hills to the northward, where the man stolen from the village of Mai-ga-doong was detained. After remaining there a day, and giving the few presents he took with him to the chief and head men, they delivered the detained man up to him in accordance with my order to that effect, and consented to forego all farther claim upon him. They (Oo-twai and party) then set out on their return to my camp; but when about 2 miles distant from the village they were overtaken by a large number of the people from the village they had left, who forcibly took possession of the released villager of Mai-ga-doong and carried him back with them. They gave no reason for this conduct, merely stating that they had changed their minds; but that circumstance did not appear to affect the presents they had received, which they retained. As such a line of proceeding, if permitted to pass unnoticed, would induce many other tribes to follow their example, and having done all in my power to induce their submission by conciliatory measures, I have given an order to the Myo-oke to proceed with an armed party of peons to demand the restoration of the captured man, and, if refused, to take him and the refractory individuals by force. This is the only instance in which I have been compelled to use coercive measures with these people, and I have no doubt that the appearance of a few muskets will have the desired effect.

Thermometer 6 A.M. 63°; 1 P.M. 78°; 6 P.M. 72°.

Dec. 3 and 4.—Detained at halting-place during the last two days in preparing official correspondence of office routine. The Karen missionary (Qua-la), having accompanied me thus far, states his intention to do so throughout the route to Karen-ni, having received an invitation from some of the tribes subject to Kyay-hpye to establish schools with them, and he is also desirous of meeting that chief to obtain his countenance to these measures.

Thermometer 6 A.M. 54°; 1 P.M. 74°; 4 P.M. 68°.

Dec. 5.—Started at 8 A.M., the mist rising so thick from the stream that the elephants could not proceed until the sun's rays had dispersed it: the road across low, but very steep hills, with water-courses falling into the Koo-Lhoo stream. Reached halting-

place on the Ko-Lau, a feeder of the former, which drains one of the numerous shallow valleys of this group of hills which cover the flanks of the higher ranges. Course to Ko-Lau stream east—estimated distance 3 miles.

Course up the stream E.N.E.—estimated distance $1\frac{1}{4}$ mile.

The Tsau-Kai, or chief of the Karens of Koo-Lhoo, accompanied me to this place, for the purpose of arranging a difficulty with the chief of Ko-Lau. His story is as follows:—"I am the chief of all the Karens of the valley of Ko-Lhoo, where I resided until eight moons since, when I was obliged to fly from my home with my family and seek protection from the vengeance of that man (pointing to the chief of Ko-Lau), with the Karens of Bangalee, where the Na-Khan (Quay-lay) resides. He threatened vengeance upon me for having killed one of his people, who in concert with the red Karens (^b) from across the eastern mountains, had on several occasions attacked and plundered the villages belonging to me. On the last occasion of his coming I caught him, placed him in bonds, and ordered one of my people to kill him, which was done: he forfeited his life justly from his crimes, and my people have been relieved of an enemy, during whose existence there was no peace for them, and now this man seeks my life. If I have not stated the truth, let him now in your presence spear me to death." Such was the chief's story, which was corroborated by the Na-Khan. On its termination, the chief of Ko-Lau-Karens, who sat immediately in front of me, smoking with a vehemence that plainly showed it was not the pipe of peace he held, started up from his sitting posture with an apparent intention of spearing his neighbour and denying the truth of his statement afterwards; but before he could move away I placed my hand upon his shoulder and bade him keep his seat, telling him that I came there to do justice to both parties, and after I had heard his statement I would give my decision. He, however, did not attempt to deny the wicked practices of his clansmen who had been killed, but qualified them by referring to ancient feuds between the tribes, which had never been settled, and so forth; he therefore claimed life for life, in accordance with the custom of their race. To this I was compelled to place a decided negative, and to repeat the lesson to him which had been so frequently repeated to other tribes, to the effect that my presence among them was the signal for the cessation of all old feuds between the tribes: by-gones must henceforth be by-gones; that in the present case the offender had met a just punishment, and as I had made it my affair and had taken the responsibility of his death upon myself, I was the party to be speared, if any one; and that for the future these disputes must be referred to me for adjustment, when the wrong-doer would be punished and the sufferer protected.

Much useless verbiage passed between the chiefs, participated in

by several of the head men of both tribes. The explanations of the Na-Khan meanwhile appeared to have a mollifying effect, as the fumes from the chief's pipe curled upwards with a graceful peacefulness, until at length, on the exhibition of a few painted handkerchiefs, his heart was subdued and he accepted the gifts, acceded to my terms of arrangement, and shook his friend by the hand, in token of reconciliation and peace between them.

Other little matters of stolen kye-dzes,* by this chief of Ko-Lau, were arranged amicably ere I left the place; and one poor fellow complained of the loss of his three children, who were stolen from him by people from the valley of the Hpoo-Loo across the range, taken from him, he said, in connivance with his own chief, he of the pipe, who disclaimed any participation therein, but promised to use his influence for their restoration, and to accompany me to the village where they are detained, for that purpose.

Complaints of the above nature crowd upon me as I advance into these wilds, where, from the vicinity to Karen-ni, the facilities for disposing of victims to this degraded state of society are abundant.

Dec. 6.—The course of the road from halting-place had been cut across a range of hills much to the southward of the general line, and seeing from the appearance of the formations abutting on the main range that a road might be made along the ridge of a spur to within a short distance of the Pass, I got the Karens to work on the new line, and proceeded with them until reaching the only spot upon which a small tent could be pitched under the shoulder of the high peak above the Pass. Here I halted, sending the elephants and baggage across the range into the valley of the Hpoo-Loo. In ascending to this point both elephants and Karens, who were employed carrying the baggage, were in considerable danger from the fierce east wind which at this season blows almost continuously for nearly two months. Several of the ridges upon which they were exposed to its full force were so narrow, and the wind so strong, that it required extreme care in passing them to prevent being hurled many hundred feet down the almost perpendicular sides of the mountain. Course N.E.E.—estimated distance $1\frac{3}{4}$ miles.

Thermometer, noon 68° ; 6 P.M. 54° .

The east wind continued with full force during the whole night.

Sunday, Dec. 7.—Ascended to the top of the pass to ascertain its height: the boiling-point gave the altitude of 6520 feet.

From this point it was seen that the valley of the Hpoo-Loo was enclosed on its eastern side by a still higher range than that on which I stood, so that the hill-ranges and more level country of

* Spirit-drums.

Karen-ni could not be seen. In every direction the scenery was of the grandest and most imposing description, surpassing anything in the power of words to describe, but bearing to the heart a feeling of profound pity and commiseration for the abject state of the races which inhabit it.

The easterly gale prevailed during the whole day and through the night.

Thermometer 6 A.M. 48° ; 1 P.M. 69° ; 6 P.M. 55° .

Dec. 8.—Proceeded across the pass and down the steep descent on its eastern face into the valley of the Hpoo-Loo: to the westward of the pass the water-parting is into the Thouk-yai-khat and Sitang, and the east through this valley into the Salween. The drainage here is separated from that of the Yoon-za-len by several ranges of hills, its course being at a distance of two days' journey to the south of this valley: this separation of the drainage forms a well-defined line of demarcation between Karen-ni and Toungu; but the Karens of this valley, of which there are three villages, consider the high ridges on its eastern side as the boundary, and use both sides of the valley for their cultivations, without molestation from the Karen-ni authorities.

This valley is known generally as the Kala-tee-nee-noung in Burmese—its name by the Karens being, as previously noted, the Hpoo-Loo.

Course N.E.—estimated distance one mile.

The Jemadar reported that one of the elephants had been cold-struck, and that he would not be able to proceed for two or three days. This is so far opportune, as the road east from this point has not yet been opened, the people from Karen-ni not having reached the range to the eastward.

Dec. 9.—Ascertained the height of this valley by the boiling-point to be 3270 feet.

The man from Ko-Lau, whose children are detained at this place, brought his affair to my notice, and, in the midst of the crowd that sat before my tent, pointed out the man in whose possession they were; who, on being questioned, stated that his elder brother had stolen the children, and, hearing of my approach, had fled from the village, leaving them in his charge. They were then produced—a boy of about six and a girl of four years of age: the poor little creatures were entirely naked, and as the temperature was below 50° , with a keen east wind blowing up the valley, they sat huddled together shivering in every limb with cold; and, to add to the boy's misery, his right knee had been bitten through by a dog, and as no care had been taken of the wound, the knee-cap was swollen to an extent that prevented the limb being straightened. A more distressing picture of human misery than these children presented I never witnessed. It appeared that some of the women of the tribe

had bestowed upon the children some sort of a covering; but the man who had charge of them prevented their wearing it. I denounced the fellow before his tribe as a heartless wretch for his inhumanity, and having procured some clothing for the poor things, gave them over to their parent, who, with the lamed boy on his back and the girl clinging to the torn fragments of his tunic, proceeded with all haste up the mountain-side and speedily disappeared across the pass, fearful of again losing perhaps the only objects in this world which, with the still absent one, held a place in his breast. The other child, I am informed, is at a village some two days' journey on the line of route eastward.

Thermometer 6 A.M. 55°; 1 P.M. 71°; 6 P.M. 58°.

Dec. 10.—The eldest son of the chief of Karen-ni, with upwards of 100 of his people, arrived this morning, to open the road directly from this valley to a point of contact with that completed on the eastern side of the range. As they swept across the Karen clearings on the eastern flank of the valley, they formed a striking picture and strong contrast with the inhabitants of these villages. Each man, with a cone-shaped red turban on his head and spear in hand, which glittered in the sun's rays, accompanying the chief on a white pony, realized in some degree the advance of a marauding clan of Highlanders of ancient story; but in this case, as in many others, distance lent enchantment to the view, as on nearer approach, with the exception of the uniform red turban and short drawers reaching midway on the thigh, they were scarcely one remove in point of cleanliness from the mass of filthy beings of this locality.

Having selected a point of ascent up the eastern range, the red Karens commenced work in good earnest, promising to get it finished in two days.

Thermometer 6 A.M. 56°; 1 P.M. 73°; 6 P.M. 58°.

Dec. 11.—The sick elephant being reported sufficiently well to be able to proceed to-morrow, I collected the whole of the Yaings, who have been employed in opening the road from Koo-Lhoo to this point, for the purpose of paying them. My tent being pitched on a rising piece of ground close to the spot at which the Yaings were assembled, it was curious to observe the groups as they sat, each tribe separately, eyeing intently the division of the gounge-bounds from the piece of muslin ere they were distributed, and the transition from an aggregated mass of about five hundred dirty heads, scarcely distinguishable from the ground around them, to the same bound round with a wreath of snow-white muslin—the ends being stuck upright on the top-knot of their hair—was bordering upon the ridiculous. Some, who had earned two gounge-bounds, had bound the heads of their infant children with the extra one, and on receipt of the silver coin (four anna pieces) due to them, each section made its way back to its own village shouting

and capering up the mountain-path, like imps incarnate, of which problematical species they would form no bad specimens.

Having ascertained that a poor old woman of a tribe of Bways was detained in bondage by the chief of a Yaing tribe at the head of this valley, on my arrival here I despatched one of the Na-Khans with a request that she be delivered to her people, some of whom had accompanied the party. The Na-Khan returned, however, stating that he had failed to obtain her release, and that the chief was prepared to resist any attempt to take her away by force. Being within our line of boundary this could not be suffered, and I had ordered two of the elephants to be prepared and several of the Burman guard to accompany me, intending to take advantage of the moonlight to approach the village before the people had risen. During the afternoon, however, a member of the community of Hpoo-Loo came with the Na-Khan to my tent, stating that the chief of the tribe by whom the woman was detained was his relation, and that if I would furnish him with a few articles as presents, he would return to camp, bringing the man and the chief with him. He left with the articles in his possession, and during the forenoon returned, accompanied by the chief, several of the headmen of the tribe, and the old woman. One of the men had in his possession an old musket, and, presuming upon its terror-inspiring properties, the chief on meeting with the Na-Khan assumed a high tone, threatening him for having approached the village. He was told to alter his behaviour, and on being brought to me at my tent appeared to have become considerably tamed, listened with apparent deference to what I had to say, and gave up the poor old woman to her people without any demand beyond the usual one of a Kyee-dzee, said to be due by her people to his tribe. I presented a few rupees and handkerchiefs to both himself and head men, and he appeared to be agreeably surprised at the treatment he received. During the time of our negotiation, when sitting before my tent, the Burman guard fired off the old charges from their muskets, and the sick elephant, to whom medicine was being administered, roared and whined like a refractory Cyclops, which discordant sounds had, I suspect, great influence in taming the savage into amiability.

Dec. 12.—Proceeded by a zigzag road, very steep in some parts, to the top of the eastern range, the distance as shown by the perambulator being nearly 2 miles; ascertained the height to be 7425 feet. The whole hill-systems were visible from this elevation, the Nat Toun bearing s.s.e., being the highest point within range of vision, ascertained by me on a former occasion to be upwards of 8000 feet. To the westward, the Sitang was clearly visible through a break in the ranges, having the appearance, seen

through the blue haze, of separated lakes—the distance in a direct line being about 35 miles.

I attempted from this point to get a general direction of the ranges, and found that on the west of my position, the large masses had a direction about s.s.e. and n.n.w., while those on the east, less aggregated but more broken, had no line that could be applied as a general course of the up-heavement; but the contortions of their flanks and spurs and their rugged and uneven outline showed them to belong to the limestone series of formations.

Course north by east, distance 6 miles, to halting-place on the valley of Tha-bo-loo.

Dec. 13.—The road to-day passed along the base of several distinct ranges of lime and sandstone to the head of one of the feeders of the Poug-Loung-Ngay, near the village of a Karen-ni Yaing chief (Loot-Tsee), after whom the locality is named. This individual appears to exercise the chief control over all the Karens of this locality, and holds himself independent of the authorities of Karen-ni, against whose people he has on several occasions opposed a successful resistance to their demands.

Course south-east, $3\frac{1}{4}$ miles; north-east, 3 miles.

Sunday, 14.—During the usual halt on the Sabbath, the chief Loot-Tsee appeared in the camp, bringing the stolen child belonging to a man who has accompanied the Karen missionary, and not to the man whose two children were restored to him at Hpoo-Loo as stated previously. The restoration to the father was easily arranged through the medium of a few presents, and the chief was informed that such practices as robbery and kidnapping would be put an end to on my meeting the chiefs of Karen-ni.

All the Yaing tribes on the eastern waterparting assume the costume and speak the dialect of Karen-ni. The contrast, especially as regards the dress of the females, is striking and peculiar when compared with that of the western—or, as a local distinction, the Toungu-Yaings—whose clothing consists of a simple petticoat and armless tunic. The former wear a head wrapper of dark cloth, made up square from the forehead, resembling the head-dress of the Italian peasant-women; a piece of the same material hanging in front of the bust, and tucked into the waist of the lower covering, a short petticoat reaching barely to the knee. Over these garments they hang first round the neck heavy masses of bead-necklaces, and any silver ornaments they possess, coins, &c. The hole in the lobe of the ear is enormously enlarged; in this a large plug of metal or plated wood is placed; then round their hips a band of red and white beads of 6 inches broad, and from the knee-front to the middle of the calf of the leg the same massive wrapper of red and white beads, brass and copper

rings of from 3 to 4 lbs. weight on each leg, which in the older females gives the calf of the leg the appearance of having been compressed from below the knee to the middle of the calf, where the flesh bulges out and forms a sort of ledge for the load to rest upon. Such a method of adornment one would fancy tended to impede the movements of mountaineers, who are in the daily habit of carrying heavy loads on their backs suspended by a band across the forehead and yokes over the shoulders; but they appear to suffer no inconvenience from it, and regard her as handsome whose limbs are loaded to an extent that compels her to perform two segments of a circle at every step she takes.

All, from the wrinkled grandmother of eighty to the child of four or five years old, smoke a short bamboo or horn-pipe, the bowl being made of brass or copper; and among a group of smokers I observed a woman who, after smoking the contents of the pipe, tapped the bowl in the palm of her hand to extract the unburnt remnants, which, having collected, she tossed into her mouth, chewed and swallowed with evident gusto. I mentioned this circumstance to the Karen teacher, and his remark was that it imparted a stimulus to the stomach and produced a sensation similar to that from taking opium.

Dec. 15.—The road to-day passed along two sides of several limestone ranges, going over a zigzag distance by the wheel, of nearly 8 miles to the stream of the Poug Loung, one of the affluents of the Salween. This stream is about 30 yards broad, with a very rapid current of 3 to 4 feet depth, showing a steep inclination of the valley to the southward. Course north-east.—Estimated distance $4\frac{1}{2}$ miles.

The Karen agent Moug-Hpo, with the son of the chief Kyay-Hpo-Gyee, met me at this halting-place, bringing a present of a bullock, rice, &c., with a friendly message of welcome from the chief. A large quantity of fine teak on the hill-sides of the valley was seen, which some timber-merchants from the lower provinces have been working for the Moulmein market.

Dec. 16.—Both my servants being laid up with strong fever, I was compelled to remain stationary at the present camp to enable them to take the usual remedies.

On examining the hills in the vicinity of the camp, I found that the teak, with which a few stunted firs (*Pinus longifolia*) were mixed, invariably affected the sandstone patches lying on the limestone; the latter in some places striking perpendicularly up for many hundred feet above the sandstone. Much quartz and clay jasper accompany the above rocks as rolled fragments in the bed of the stream. Ascertained height of halting-place 2421 feet.

Thermometer 53° 6 A.M.; 78° 2 P.M.; 63° 6 P.M.

Dec. 17.—The sick men being sufficiently recovered to enable

them to proceed on the elephants, started at daylight along a road of steady ascent to the top of the range at about 6500 feet, varying from which height to 5000 the route throughout the day was maintained. No sight of the lower land of Karen-ni was had until reaching an opening in the last high range to the eastward, when, and in descending its eastern face, the whole country of Karen-ni lay spread out before us. Unlike the localities of the tribes of Karens in the mountains passed to the westward, the plantations on this side were all carefully cleared of weeds, when the crops had been removed, showing a bright-red surface, and bringing out clearly the waving outline of the slopes; this, combined with the distant view of the lower lands of Karen-ni, all bared of their primeval forest, and rolling in broad-topped undulations to the distant horizon, comprised a scene of beauty second to none, but some of the inland portions of Java, which it greatly resembles.

Many large-sized firs, associated with teak and Eén (*Dipterocarpus alatus*), passed during the march. The formations more prominently available for examination than hitherto were the principal form of limestone, with its accompanying sandstones and clay-shales.

Halting-place on one of the feeders of the Nan-pai-khyoung.

Course E.N.E.—estimated distance $8\frac{1}{2}$ miles.

Dec. 18.—The continued descent of yesterday proved so fatiguing to both man and beast, that it was found necessary to make a short march to-day, the road for the most part descending down the spurs of the main range. Halted on the Nan-pai-khyoung, an affluent of the Salween, which forms the drainage of the centre lands of Karen-ni. Course N.N.E.—estimated distance $2\frac{3}{4}$ miles.

Dec. 19.—Proceeded by a road cut up the course of a gorge, in the lateral spurs, to the main trading-road through Karen-ni from the northward, a good cart-road, which can be traversed by carriages to the Salween at a distance to the south of three days' march from the junction with the main road to the chief village; the road passes across the undulating low hills of Karen-ni, portions of which have been cultivated in fields, and the crops but lately removed. Other portions, fallow of the past season, were being prepared with the hoe for next year's rains, the rank grass and weeds on the surface being collected in patches previous to burning. At the point of the main road a band of gongs and drums with a bamboo flute joined the party, and kept up an incessant thumping, until our arrival at the chief's village, comprising upwards of two hundred houses. All the chief men of the surrounding villages had assembled to do us honour, each one riding a pony of very small pretensions to good looks or size; but whether owing to the spirit-stirring sounds of the brass instruments, or, more probable, the spirit which their riders had imbibed, they

coursed with each other up and down the slopes, running madly after each other, and cutting such capers as only drunken riders and drunken beasts can cut with impunity, and they so continued their performance until my arrival at the halting-place on a rising ground near the chief's residence. Course N.N.E.—estimated distance $12\frac{1}{2}$ miles.

The villages seen along the line of road are all very prettily situated on the tops of the hillocks, surrounded by clumps of the gigantic bamboo.

Dec. 20.—Having intimated my intention of visiting the chief at his residence, he sent a message to the effect that he would prefer visiting me at my tent; the reason, although not expressed, being (a common one with all the Karen tribes) that the visit of strangers to their houses is attended with subsequent calamity to them in the shape of some disease of a contagious nature, and for the same reason the line of road which in many places would have been more direct by passing close to the villages was invariably turned away, making a considerable *détour* in some instances. To return to the chief: the old man accordingly made his appearance at my tent during the forenoon, and on entering it at my invitation stood for some time regarding it with extreme curiosity. Having satisfied himself that it was not a bamboo fabric, he entered it, and seated himself at my request on a camp-chair, drawing up his legs on the seat tailor-fashion. From the letters I had received from him at Toungu, in which he constantly referred to his extreme age, as well as from the reports of those who had seen him, I was prepared to meet an old man of seventy or so; but his appearance fully bore out his statement that he had passed his ninetieth year. Small of frame, which bore evidence of his having been a wiry, active man, he carried himself remarkably well for his age; but the bent spine, the tremulous motion of the hands and bleared eye, with a vacant expression and a hesitation of speech, told but too true a tale of his having passed the ordinary age assigned to man.

In dress he was distinguished from his people by wearing the costume of the Shans (a double-breasted jacket and loose trousers of white cloth with a turban of the same material); across the left shoulder hung, suspended by a red cord, his state *dha* with the sheath and handle covered with silver plates ornamented; and as a support, forming at the same time his insignia of authority, he carried a stout spear of seven feet long with a broad blade and the whole of the shaft encased in silver. From the head of the shaft at the point of insertion of the blade, a mass of horse-hair, dyed red, hung down fringe-like, giving rather a handsome appearance to the weapon.

I informed the old chief that the governor of the province of Pegu had deputed me on my present mission with the double

purpose of opening a trading-road to the Shans through Karen-ni and across the mountain region to the west into the valley of the Sitang, which I had accomplished; and also that, hearing of the dissensions and repeated aggressions of other chiefs of Karen-ni upon his, Kyay-hpo-gyee's, people, the governor of Pegu was desirous that all misunderstandings should be arranged through my agency and peace established between them. Without this, no permanent security to the safe passage of the traders would be attained, and the country derive no benefit from the measures adopted by our Government, which regarded with warm interest the prosperity of Karen-ni as an independent power. I also brought other matters to the chief's notice, especially the subject of the agency of his people in slavery, its effects upon the Yaings within our border, and its objectionable and revolting character. And finally, on introducing the Karen-ni teacher, Qua-lah, to him, I informed him of the benefits to be derived by his people from adopting a means of enlightenment which would raise them above the reproach of being uncivilised and barbarous, and, in the possession of a written character, place them on a level with the surrounding nations of Shans, Siamese and Burmese. To all I said, which was interpreted to him by the Shan My-Hpoo in an exceedingly condensed form, if the shortness of the speech were a sufficient indication, the old man appeared to give a nervous listening, and then replied in a string of short coughing sentences, which occupied him for more than half an hour, the burden of which was the oft-repeated story conveyed in his letters (written in Burmese by a Shan Poon-gyee who resides here), of the ingratitude of Kyau Pee Tee, the chief of Ngwae Toungh, who from being his dependent and protégé, and entrusted with a portion of the country, had sought the aid of the Burmese to dispossess him, Kyay-hpo-gyee, and become ruler of the country, subjecting it to the authority of the Burmese, &c.; to which government neither he, the chief, nor his sons, would ever submit, on account of the atrocities they committed when they invaded the country from Toungh about ten years ago. This one subject appeared to hold possession of the old chief's mind to the exclusion of every other; and I perceived, as he proceeded on with the garrulity of extreme old age with a repetition of the same story (or, as interpreted into Burmese by his son-in-law the Shan, fool's talk), the uselessness of prolonging a conversation with him. I therefore desired the Shan to inform him that I would write a letter to Kyau Pee Tee, expressing a wish for an interview with him, and informing him of my object in visiting Karen-ni, and that it would defer the consideration of other matters for the present. I accordingly wrote a letter to Kyau Pee Tee, and sent it by the agent Mounghpoo and the old Shan trader OoMyat, but could procure no

guide of Kyay-hpo-gyee's people, and with much difficulty I induced a Shan, long resident here, to accompany them as guide, so great is the dread of these people of capture and slavery.

I availed myself of the opportunity of the chief's visit to obtain particulars of the history of his race, who are, ethnically considered, a distinct people from the surrounding tribes of Karens. Those particulars, as being too lengthy for a diary, I have embodied in my general report on the country.

Thermometer 6 A.M. 54° ; 2 P.M. 73° ; 6 P.M. 66° .

Sunday, Dec. 1.—6 A.M. 54° ; 2 P.M. 75° ; 6 P.M. 68° .

Dec. 22.—Having pitched the camp close to the village of the chief's residence, I have in consequence been subjected to the incessant annoyance of being stared at and noise-confused by the inhabitants—men, women, and children; the last consider me some wild beast whom it would be dangerous to approach within reach. Under the impression that I had performed my part of the obligation and given every one an opportunity of satisfying their curiosity, I moved the camp to the top of an adjacent hill, whence a splendid view is had of the surrounding country, and, with the exception of chance passengers, I shall be free from the annoyance of an insatiable curiosity.

During the moving of the camp I proceeded to a prominent point on the hills in the vicinity, to examine the country. From my position, looking southward, the whole space presented a mass of broad-topped undulations varying from 200 to 600 feet in height, the valleys curving with a gentle slope to the centre, down which, in broad patches, the newly prepared surface offered a striking contrast to the portions clothed with stubble of last season's crops in the bright red and chocolate hues of the soil. Small patches of low jungle clothed the sides of the occasional steep gorges, and this, with the clumps of gigantic bamboo throwing its points of feathered foliage in graceful curves around and high above the villages within its shade, relieved the monotony of the landscape by the varied shades of green which shone brilliantly in the sun's rays, merging in the far distance in darker shades until lost in the blue haze that showed the ranges of limestone-rocks forming the background of the picture in the direction of the Salween River. On the east side, an immense fissure in the formation with steep sides and narrow centre diversified the scene, on both sides of which the same undulating surface, with broad patches of cultivation, extends to the base of a ridge of hills which separate these lands from the Salween River. To the west the curves are more extended, giving to the centre an "ocean wave-like" shape, dotted over with sites of villages and low peaks of limestone-rock covered with vegetation, increasing in dimensions as they approach the main ranges, whose rugged peaks, pile upon pile, close the scene on that

side. A high swelling ridge, bare of vegetation, shut out the prospect northward; but the guide informed me that at the distance of a few circles beyond, the undulations merged into a vast plain which extends far into the Shan States.

I had frequently heard of the beauty of this country, but language is a feeble agent in depicting these scenes of Nature's grandeur in all their full reality. It requires only the presence of water in meandering streams coursing the base of the undulating hills to render it a perfection of the picturesque; but this, from being considerably higher than the main drainage of the western ranges and separated therefrom by the broken masses of the mountain limestone, it does not possess. This absence of running streams, however, applies only to the centre portion of the surface, as at a distance of a few miles north and south copious streams flow eastward into the Salween—the Nan-pai to the south and the Poon and its tributaries to the north of my position. In all the steep gorges, which are clothed with dense vegetation, small rivulets exist, of sufficient capacity to meet all the wants of the inhabitants, without the necessity for seeking it below the surface of the hill valleys.

I ascertained the height of my present camp to be 3315 feet, and with this datum the range of elevation of the undulating surface may be stated at from 3000 to 3650 feet above the sea-level.

Thermometer 6 A.M. 55°; 2 P.M. 72°; 6 P.M. 65°.

The real grounds of objection to my visiting the residence of the old chief were accidentally discovered during the forenoon by several of the Burmese guard, who, in strolling through the village near the chief's house, came upon two poor wretches confined by a chain round the neck and with their legs in bamboo stocks in a small enclosure, where they have been kept for several months past; their crime being, a suspicion of their having stolen a bullock and a kye-dzee, the property of a relation of the chief who resides at a village near that from whence these men, who are Yaings, were taken. I have already spoken to the Shan and the son of the chief on the inhumanity of such treatment, and on delivering the present I have brought for him shall make a request for their release.

Dec. 23.—Accompanied by the Shan and one of the headmen of the village, I proceeded to the termination of the undulating formation at a distance of about eight miles to the northward, at which point a magnificent prospect burst at once upon the view. At from 800 to 1000 feet below us lay an unbroken plain of at least 30 by 50 miles, spreading to the northward until lost in the faint blue base-line of the distant hills which bounded the horizon: nearest the base of our position beautifully undulating valleys with gentle curves swept downwards until lost in the level surface of

the plain, upon whose broad space, at intervals of a few miles, bright spots of verdure with the towering bamboo marked the sites of villages near which herds of cattle grazed in the stubble of the past harvest. Hills enclosed the plain on every side, forming a God-created ring-fence to a scene which is surpassingly beautiful.

During the journey several places of interment of the dead were passed. Each village reserves a plot of jungle for this purpose; and, in the deep foliage of the underwood, small miniature houses are seen, upon which hang suspended the baskets, implements of cultivation and household use, and fresh offerings of pumpkins, heads of maize and millet, and the neverfailing gourd-shell, which contained the intoxicating beverage (the fermented liquor of rice and millet) of the departed one. In addition to the articles of daily use when alive, a portion of the valuables (gold or silver ornaments) of the deceased are buried with the body; a custom observed by all Karens, who know no other than the degraded spirit worship.⁽¹⁰⁾

On my return to camp, I found the agent Moung-Hpo with Oo-Myat returned from the chief of Ngwai-Toung, Kyau-Pee-Tee, bringing an answer to my letter couched in the most friendly terms. He states his pleasure at my arrival in the country, and the gratification it will afford him to meet me; that the unfortunate state of affairs between himself and the chief Kyay-Hpo-Gyee renders it impossible for him to come within his authority; but that he will welcome me to his village and do all in his power to bring about the settlement of their differences in a spirit that the inhabitants of the country, who are of the same kindred, may enjoy peace and security for the future. He also professes to be equally interested with myself in the prosperity of the traders, to whom he promises to afford all the assistance in his power in their passage through the country.

I caused the contents of the letter to be communicated to the chief, his sons, and the head men, urging upon them the necessity for their co-operation with me in the good work of reconciliation which was now open to them. I also suggested that the chief's sons accompany me to Ngwai-Toung, but they shrunk from the idea of what, they said, would be certain death to them for reasons best known to themselves. I requested them, however, to consult with their father and let me know the result as soon as possible, as it was my intention to proceed to Ngwai-Toung.

Thermometer 6 A.M. 58°; 2 P.M. 75°; 6 P.M. 66°.

Dec. 24.—Rain during the night, attended with clouds of drift, which continued during the whole of the day, keeping the temperature below 60°, and producing an uncomfortable sensation of coldness. These north-easterly showers are seasonable throughout

the range of the monsoon changes, and occur in the Irrawaddy, Sitang and Salween valleys during this month.

The implements of cultivation in use throughout the country are a broad-bladed hoe and the Shan plough; the latter of very light construction, with a share of iron, or rather a shoe of six inches long by four broad, fitted on to the wood of the share and made with a slight curve towards the point, which prevents it penetrating the soil beyond four inches deep. The hoe is used chiefly on the sloping sides of the hills, the plough on the more level surfaces, and in the use of both, the women partake equally with the men; in fact, from what I have witnessed, the females perform by far the larger portion of out-door work and appear to be a hardy, industrious class.⁽¹¹⁾ On proceeding to their fields or returning from them with a heavy load over their back, after the labours of the day, each one carries a spindle of prepared cotton-wool in her left hand and twister in the right one, with which they spin the cotton-yarn as they move along, to weave into articles of clothing at their leisure.

Besides paddy, the cereals planted are maize, millet, and kyuk; the two last used chiefly in the manufacture of a fermented liquid (Koung) which is universally drunk by all classes, and is regarded as a panacea for "all the ills that flesh is heir to." Moderation in the use of this beverage appears to be the exception to the rule. Vegetables of the pumpkin class, with several descriptions of beans, the oil "sesame," the ground-nut, tobacco and cotton-plants, form a portion of their cultivation, and, judging from the size of esculents left to rot or for seed in the fields, the soil (a rich loam of bright red and chocolate hues) is of more than ordinary fertility.

The level surface-lands of the plain are planted and cropped annually, similar to those of paddy lands (wet) generally; but the uplands, in the absence of the renovation from submersion, are allowed to lie fallow three or four years, by which time they are covered with grass and brushwood sufficient in the decomposition to afford nutriment to the soil for a new crop.

The chief's son (Kwoon Teo) sent a message to the effect that having consulted the augury of the bones of a fowl, the result was against his accompanying me to Ngwai Toung, but that he would accompany his father to my tent to-morrow, if the rain ceased, to talk the matter over. The ridiculous superstition of consulting the oracle by the position and number of the small orifices in the bones of fowls, upon which most of the Karen race pin their faith, is a serious obstacle to the introduction of any measure tending to their improvement. An instance of this occurred a few days since, when the eldest son of the chief, suffering from an attack of fever, the result, I presume, of an excess of koung yai, I sent him an emetic

powder; but he was deterred from taking it by the result of the indications of the augury he had consulted, which was unfavourable, and he now lies ill of intermittent fever, relying upon the "spirit" of his worship to restore him.

Thermometer 6 A.M. 54°; 2 P.M. 58°; 6 P.M. 56°.

Dec. 25.—The chief, with his sons and a numerous retinue, came to my tent to consult on the matters touching the letter from the chief of Ngwai-Toung, Kyau-Pee-Tee. In reply to my proposition, he stated that neither he, his sons, nor the chief men, believed in the professions of Pee-Tee, nor would they trust themselves within his power; that, as a test of his (Pee-Tee's) sincerity, he should accompany me on my return from Ngwai-Toung, when he would be well received and every consideration given to anything he had to offer as a means of reconciliation; that Pee-Tee was formerly regarded by him as his son until after assigning him a portion of the country, when he sought the favour of the Burman Government, which instigated him in his attacks upon Kyay-Hpo-Gyee's people and villages, since which there has been no peace for the inhabitants. He stated his desire of placing the entire control of the country in the hands of our Government or of myself, if I would remain in the country; but that in the event of my returning without bringing matters to a friendly termination, the same anarchy and unhappiness would follow as had obtained for the past ten years, and the Burmese, who had intimated an intention of placing a frontier guard within the Karen-ni country subject to him, at a place to the northward, called Nan-tsan-khan, would, through Nga-Pee-Tee's agency, eventually become masters of the country. Finally, that ere he passed away he was desirous of securing peace to his people and sons by the protection of our Government on any terms.

In reply, I could only urge what I had previously stated, that, for the security of both parties and the traders, the governor of Pegu had deputed me to endeavour to effect a reconciliation between the chiefs, which on my arrival at Ngwai-Toung I should use my best endeavours to accomplish. With regard to the subject of the transfer of his country to our Government, I explained that I was not empowered to treat, but that his wishes therein, as well as all other matters affecting the tranquillity of the country, would be communicated to my superior, when every consideration would be given thereto.

I took the opportunity of pointing out the malpractices of the Yaings of the western ranges within his territory, as well of the red Karens themselves, in attacking and carrying into slavery the people from the tribes within the Toungu boundary. He said that such acts were committed without his knowledge or authority, each village chief acting independently of him, and that he would

do all in his power to put a stop to such for the future, but that the best means of preventing it would be my residence in the country, as the village chiefs would respect and fear my authority.

Before the party left I spoke to the chief's son, Koon-Tee, on the inhumanity of keeping the two poor wretches chained by the neck and legs in his father's village. He stated that both had been caught stealing cattle, and that they were so detained, not by the chief, but by the people whose bullocks had been stolen, until ransomed by their relatives. This fact proved, what I had all along suspected, that there is actually no government in the country, and that the chief is so in name only, the patriarch of his clan.

The eldest son of the chief (Koon-Sha), who was suffering from the effect of fever, preferred a claim for 420 rupees for people employed on this side of the hills in making the road to the junction with the main trading one. Having satisfied myself as to its correctness, I paid the money, which was distributed forthwith among numerous expectants, who, with matchlock, or from one to three spears in hand and a dagger at the waist, presented the appearance of men who would brook no injustice even from a chief's son⁽¹³⁾.

Thermometer 6 A.M. 57°; 2 P.M. 64°; 4 P.M. 62°; with clouds and passing mist which obscured the sun during the whole day.

Dec. 26.—Several individuals of tribes who inhabit the mountains to the north-west of the Shan States came to see me. They call themselves Lat-kta and Padoung; the former designated tarvo, or bare-headed, by the red Karens, from the fashion of cropping their hair close, with the exception of two long locks hanging down from the temples. They are profusely decorated with ornaments of shells and beads, a coronet of the former round the head and heavy necklaces of the latter. Both tribes have a peculiarity of feature, resembling in some measure the Chinese, with the iris coloured of a light brown, which would mark them as a distinct race from the Karens of this locality and the adjacent mountain-ranges. Their language also is entirely distinct from any spoken by the Karen tribes, and resembles in sound and inflection the Chinese and Shan languages.

Thermometer 6 A.M. 58°; 2 P.M. 70°; 6 P.M. 66°.

Dec. 27.—During our early walk across some paddy cultivation in stubble, a pheasant and several red-legged partridges got up: the latter appear to be plentiful, as I hear them from the tent calling from each patch of long grass around. On my return I saw several plants of the wild raspberry creeping among the limestone-blocks: they were in fruit, which is small and with little taste or flavour. I also discovered a vine, bearing bunches of white flowers of a soft and pleasant scent. The whole of the vines and creepers at present in bloom have a similar fragrant scent, in a greater or

less degree, and all would form an acquisition to the ornamental plants of our gardens.

Thermometer 6 A.M. 63°; 2 P.M. 72°; 6 P.M. 64°.

Sunday, Dec. 28.—Sent an intimation to the chief of my intention to move camp to-morrow to NOUNG BELAI, the residence of Kyay-hpo-ngay, to which place, as friendly relations exist between the two chiefs, the son of Kyay-hpo-gyee, Koon Tee, is desirous of accompanying me.

The Shan Poon-gye paid me a visit during the afternoon, and in a conversation on the subject of the spirit-worship of the red Karens and their abject superstitions, he said that many of the youths evinced a wish to be taught to read and write, and to learn the forms of prayer of the Buddhist faith, for which purpose they had occasionally visited his monastery, but that the parents had chastised them for it, and prevented their returning. The Karen missionary (Qualah) also finds that they entertain an insuperable objection to adopt a faith whose tenets prohibit the use of the intoxicating kOUNG YAI: to substitute water for it (which, by the way, they use rarely for purposes of ablution, and never for drinking when their favourite kOUNG YAI is to be had) would, they say, entail fatal consequences upon them.

In my inquiries regarding the prevailing diseases and causes of death, I find that the generality of the deaths in the adult population, with the exception of those from small-pox and measles, are the natural ones of old age and decrepitude; and from Kyay-hpo-gyee, the chief whose century of existence is but a few years distant, I learnt that *cholera had never visited this favoured region.*

Thermometer 6 A.M. 60°; 4 P.M. 73°; 6 P.M. 66°.

Dec. 29.—Proceeded to NOUNG BELAI, the residence of the chief Kyay-hpo-ngay, the road curving with the base-line of the undulations for 8 miles, when it descends by a gradual incline into the valley of the plain. Throughout the whole descent—as from nearer approach the level land became more distinct, with patches of water at intervals, near which herds of cattle were grazing—each turn of the road revealed fresh beauties of the landscape; and in passing along the road through the centre of the valley, the lines of trees of the Banyan and prickly Euphorbia, planted as line-fences enclosed by deep ditches, the graceful masses of gigantic bamboo all carefully fenced round, the park-like appearance of the slopes, and the careful tillage of the deep-red soil marked with the furrows of the plough, combined to form a pleasing picture, resembling in the distant prospect scenes of home and its peaceful valleys; all was in unison, mountain and valley, grove and plain, in Nature's beauty blending.

Near the foot of the low hills, on which the villages of NOUNG BELAI to the number of about 250 houses are built, a stream from

the western hills pours its waters into the plain. Guided by drains, in its course it is made to flow across the grain lands, which in one broad expanse have the appearance of a lake. As the waters drain off, the wet land is made to yield a second crop of the season by those who have an incentive to so much additional industry; but few, I am told, avail themselves of this providential water-gift, as their granaries are full to overflowing with the produce of the last season's harvest.

In accordance with their usages of welcome, I was met at about midway on the line of march by a gong, and a troop of mounted "Cossack" chiefs of villages, who, each perched on his high saddle, spear in hand, and each pony with a strap of small bells as a neck-strap to the bridle, kept up such an intolerable jingling, that nearly drove my own beast mad, so that after a series of attempts to escape from them, during which I partook of his irritation from pure sympathy, I dismounted and walked for the remainder of the journey. On the line of march, in passing through one of the villages, I observed a beautiful specimen of a leopard slung by the neck near a spirit's house. It was dropping to pieces from decomposition, having been killed by the villagers a week previously in the act of seizing a young bullock. From inquiry it appears to be the only beast of prey of the larger kind in the country—the tiger scarcely ever leaving the deep jungle-cover of the lower land.

Thermometer 6 A.M. 58°; 6 P.M. 69°.

Dec. 30.—The chief of Nong Belai, or as he is styled Kyay-hpo-ngay, in company with a young man, Po Bya, the chief of certain villages to the northward, came to my tent, with the usual tail of silver-handled and sheathed dha-bearers, and a rabble of villagers, all armed with either spear, matchlock, or musket. Neither apparel nor cleanliness distinguished these chiefs from the rest; a Shan jacket and a pair of blue trowsers, innocent of water from the day of their birth and scented powerfully with the spillings of kounng yai and the fumes of tobacco, rendered their presence within the tent by no means enjoyable. Speaking nothing but their own Karen-ni dialect, they were communicated with through the Shan agent of Kyay-hpo-gyee, Mounng-Hpoo. The young chief uttered not a word, but viewed the interior of the tent round and round again, and no doubt stored up conclusions too valuable for utterance. The chief Kyah-hpo-ngay, in reply to my suggestions affecting a reconciliation with Kya-Pee-Tee of Ngwai Toung, said that when the Burmese invaded Karen-ni, his father and uncle had been taken and killed through the agency of Kyau-Pee-Tee; but that had occurred a long time ago, however, and that he had no difficulty to settle old matters; he wished to live in peace and to see all the people of the same race (red Karens) enjoy the same, instead of fighting and plundering each other; and finally, that

any arrangement for the establishment of friendly relations between Kyau-Pee-Tee and the chief Kyay-hpo-gyee, which I could effect, he would also agree to: having said which he resumed his pipe, and so ended the conference.

In the dusk of the evening the Shan interpreter, Moungh-Hpoo, came to the tent, accompanied by several young men of the village, bringing news of, to him, dire import: two youths, he said, had just returned from Ngwai Toung (which is situated at the distance of about two miles in the plain below my camp), where some of the villagers made many inquiries as to the number of men, horses, elephants, muskets, &c., that I had brought with me; and that they, the newsmongers, before leaving the village, heard from other youths of their own stamp that measures had been concerted to attack the Engleek Meng, kill him and his party, and appropriate his property. Knowing the character of this individual, to whose agency I attribute much of the ill-feeling which exists between the chiefs, I remarked that to reports of a similar character he had given a too willing belief previously to my arrival in the country, and had urged them as facts to induce me to bring Goyah Tseet-poing with me (Europeans and Sepoys), which it appears he had promised the old chief Kyay-hpo-gyee to effect on his first appearance in Toungu in the capacity of agent from him. The burden of his song has ever since been "Goyah Tseet-poing," to my excessive annoyance, more especially so as he has invariably spread the report that I came to take possession of the country in the name of the Company, and this report I conclude to be a trick of his own to gain the point of "Goyah Tseet-poing." I accordingly told him that I gave no credit to idle stories of the kind; that if the youths had heard of any such intention from the chief Kyau-Pee-Tee himself, I would take proper notice of it; and that, although unaccompanied by "Goyah Tseet-poing," I had the means of defending my life, which it would be better for any of the race not to attempt. I cautioned him as to the consequence of spreading reports which were untrue of the objects of my visit, and which could tend only to impede the good understanding which I wished to effect.

As the position of my camp affords access to water and good forage for the elephants, which Ngwai Toung does not, I sent the agent Moungh-Hpoo, with the old Shan Oo-Myat, to present my compliments to the chief of Ngwai Toung, requesting him to meet me here, to which no objection existed on the part of Kyay-hpo-ngay or his people.

Thermometer, 6 A.M. 53°; 2 P.M. 76°; 6 P.M. 67°.

Dec. 31.—In ascertaining the height of two positions on the level of the plain, found the average to be 2850 feet above the sea-level, and as far as the eye can range the same level extends,

without any inclination, to the base of the hills which bound the horizon. The agent Moung-Hpoo with Oo-Myat returned from Ngwai Toung; they bring a message from Kyau Pee Tee and other chiefs that they cannot cross the plain to my camp, in consequence of the enmity existing between the people of NOUNG BELAI and themselves. I have, therefore, intimated my intention of visiting them to-morrow, to talk over affairs and return to camp in the afternoon. The chief Kyay-hpo-gyee's son (Kwoon-sha) is full of fears for my safety, and greatly opposed to our going to Ngwai Toung; but small attention is paid to his talk, which is full of drunken bravado.

Thermometer, 6 A.M. 48° ; 2 P.M. 76° ; 6 P.M. 68° .

Jan. 1, 1857.—Having no one with whom to interchange the good-wishes and amenities of the season in person, I commenced the year by wishing myself all the good my friends could wish me, and especially a successful issue to the undertaking I am now engaged upon.

After breakfast, I proceeded with a couple of elephants, accompanied by the Karen teacher, Qua-lah, the agent Moung-Hpoo, and a few of my own people (taking no arms with me, with the exception of my own pistols) to the village or rather Shan town of Ngwai Toung, the residence of Kyau Pee Tee, at a distance in the plain of about 3 miles. The principal part of the inhabitants are Shans, who, to the number of near 700 families, reside within a space enclosed by a ditch and rampart with a palisade of thorn-bushes on the top; the whole affair, however, affords so slight a protection that any man (a drunken Red Karen for example) could easily enter within, if so minded. Outside the enclosed space, the Red Karens have several large villages, and, judging from the immense number of Shans and Karens of both sexes who crowded round me to get a sight of the, to them, extraordinary animal in the shape of an unshaven stout white man, the population must be very numerous. Selecting a spot under a shady tree, I pitched my camp-chair and sat down, sending intimation of my arrival to the chiefs. During the time I thus waited the crowd of people, the men being all armed with spear, matchlock or dha, so crushed in upon me—some of them climbing the tree for the purpose of observation—that I was waxing hot both in body and temper, and was compelled to request them to open a passage for the air, or sit down to permit its reaching me over instead of through their bodies. As most of the Shans present spoke the Burmese language, my wish was at once complied with, and they with a hearty laugh shouted to the Karens to sit down; upon which the greater portion immediately squatted, and in return for so much complacency, I took off my topee and laid it aside, so as to afford a full view of the head of the animal, glancing round

from front to rear to admit an inspection to all alike. While thus engaged, a stir was made in the crowd; the women with shouts scampered away; a lane was formed in the mass of squatters around me, and the chief, dressed in the Burman costume, entered and sat down on his state-carpet, a not over-pleasant smelling bullock's hide. Of about 50 years of age (a Shan by birth), clean, with a pleasing and intelligent countenance that bespoke a superiority far above the best of the Red Karens, his *tout ensemble* afforded no indication of the ruthless tyrant which my friends on this side of the question described him to be: my impression was, in fact, altogether in his favour, and it was strengthened by the result of our conference.

Having received my letter informing him of the objects of my mission, we at once entered into a discussion of the matters pertaining thereto. Pointing to the short distance which separated Ngwai Young from Nounng Belai, I said that it was sorrowful to think that so short a space separated relatives and brothers in race; and that the want of a simple knowledge of each other's real feelings and intention, by personal intercourse, alone kept up the feeling of animosity and induced the acts of mutual aggression which obtained with them; and that so long as such a state of affairs prevailed, neither security to the traders nor peaceful existence to themselves could be maintained: that the Governor of Pegu, commiserating this deplorable state of affairs, was desirous of effecting a reconciliation between the chiefs, and of opening up a free and unrestricted communication with Youngu, by the road I had come, to the whole territory of Karen-ni, in which good work I solicited his co-operation. The chief in reply stated that, equally with myself, he deplored the present state of ill-feeling which separated the people of Karen-ni, and induced the frequently occurring attacks upon each other's villages, burning of houses, seizure of cattle and people, &c.; and more especially so, as upon himself fell the odium of any and every act of the kind committed in retaliation by people of the eastern side on those of the west, under the chieftainships of Kyay-hpo-gyee and Kyay-hpo-ngay. He said that the difficulty of effecting a reconciliation lay in the fact of there being no governing power in the country to check the plundering propensities of almost every man of the smallest weight or influence in the villages. The chiefs associated with himself, viz. Pya Ten, the successor of the old Pa Baa, Koon Tse, the chief of the northern portion, and Pa Ban Galay, of the southern, were, like those on the western division, chiefs merely in name; possessing neither power nor authority over any free person of the community. He informed me of a theft of cattle, thirteen in number, and of the seizure of seven Shans from the Mein Koon Tso Broaship to the northward, committed by seven individuals of

the Eastern Karens, whose names he gave, all residing within the chieftainship of NOUNG BELAI; but that he did not for that reason accuse Kyay-hpo-ngay of participation therein, or of those acts having been perpetrated by his order.

I told him of the report which had reached me on the line of march, of his having attacked and burnt several villages on the frontier of Kyay-hpo-ngay's country. He said that it was one of those infamous falsehoods perpetrated by the Shan MOUNG HP00, to keep up the bad feeling towards him, and he clearly proved that the villages in question were under the chieftainship of Koon Tso; that Kyay-hpo never had anything to do with them; that they were equally beyond his (Kyau Pee Tee's) control; and finally, that the affair was a quarrel between villages of the same party, the Eastern Karens, and that their own chief, Koon Tso, dared not interfere between the parties. This statement was fully corroborated by several Shan traders who had lately passed through the villages in question.

On the subject of his having received charge of the eastern portion of Karen-ni from Kyay-hpo-gyee, he gave an unqualified denial, and called forth two of the oldest inhabitants to relate the history of the chiefs of the country, from which it appeared that during the earlier period of Pan Ban's residence in Karen-ni, Kyay-hpo-gyee was unknown; other particulars of the country he gave with a frankness and ingenuousness that carried conviction with it, and proved beyond a doubt that all I had previously heard through the medium of "Goyah," "Tseet Poing," MOUNG HP00, the Shan agent of Kyay-hpo-gyee, was a string of lies.

I took the opportunity of inquiring as to the nature and extent of the control exercised by the Court of Ava over the eastern portion of Karen-ni. He informed me that he, as well as the Karen-ni chiefs associated with him, had become subjects of the King of Burmah, from whom, through the officer commanding the frontier military post at Mobyay, they received the orders of that Government; but that neither taxes nor other levies were made on the Karens. Also, that the Shan traders were exempt from duties on passing through the custom part of the country to the Salween; the only payment made by them being the hire of an armed party to protect them from the attacks of Dacoits in their passage through the country; that the traders occasionally made presents to himself and the Karen chiefs, when passing their localities; but such gifts were optional, and of trifling value.

On my representation that the road through the valley to the westward had now been opened direct to TOUNGU, he, to my great surprise, stated that the trading-road from the north to the eastward through the territory of Kyay-hpo was known to all as being much superior to that through his locality; but that the fear

of being plundered by the chiefs, and attacked by the villagers along the line, prevented their going by that route. Some 1200 traders had already passed through his town for Moulmein, who had been informed of my advent by a road across the western ranges; but they were deterred from taking advantage of it by the known bad character of the chiefs and headmen. He appealed to several Shan traders present who confirmed his statement, and to these men I addressed myself particularly; and promised either to accompany them myself, or furnish a guard for the protection of any number who wished to proceed by this route until well within the Tounngu district. They promised to inform their fellow-traders to the northward of what I had said, and I sincerely trust that it may have the desired effect ere I leave the country: the circumstance, however, shows me how little worthy of credit the statements of the Shan Mounng Hpoo are, an oft-repeated one being to the effect that many hundreds of Shan traders were anxiously awaiting my arrival to proceed to Tounngu by the new road.

Returning to the principal subject of my communication, Kyau Pee Tee acceded to my proposal to draw up an agreement by which the chiefs of both parties should engage to live in amity for the future, forgetting past occurrences and engaging to submit to their superior chiefs or headmen, as arbitrators of both parties, all differences which may arise in future, instead of adopting the summary method of the past. I told him that I would endeavour to obtain the restoration of the cattle and people from Munkang as an essential preliminary measure; and if acceded to, and the terms of the agreement accepted by the chiefs of Kyay-hpo's party, the document should be signed in my presence and transmitted to him. He promised his best offices to effect the good such a reconciliation would produce, but said that with the Karen chiefs it would be necessary to call into consultation the Burman officer of the frontier post.

I returned to Nounng Belai through the paddy-lands of the town, and was pleased with the care and attention which they presented. Each plot or field is carefully fenced by a stone wall of 3 feet high, made of loose blocks of a lateritic conglomerate which is found in large patches on the surface of the plain; this superstratum removed, the soil beneath appears to be sufficiently fertile, with the use of the plough and irrigation, to produce the usual variety of cereals and esculents, although in appearance harsh and sterile. Numerous herds of black cattle and buffaloes, with here and there a number of ponies and flocks of goats, all in the best condition, were grazing in the plain.

Thermometer, 6 A.M. 50°; 2 P.M. 76°; 4 P.M. 65°.

Jan. 2.—On my return yesterday afternoon, the chiefs and headmen with the Shan Mounng Hpoo were waiting at the tent

expressing by their looks the pleasure that their forebodings for my safety had not been realised. I explained to them the result of my negotiations, and told them to consult together and let me know their decision on the morrow. The heir of the house of Kyay-hpo-gyee (Koon Sha) was in the same happy state as on a former occasion, and equally brave in his liquor, so that I was compelled to use the excuse of a headache from which I was suffering, to get rid of the party for the day.

This morning the whole party assembled at the tent, and after a stormy debate gave in their consent to the arrangement proposed; but said that, before signing the agreement, it would be requisite to consult with the old chief Kyay-hpo-gyee, to whose village they proposed I should return.

During the consultation I was highly amused with the excuses put forth by the principal in the cattle-lifting, Too-la-pai by name. He said that he took them in satisfaction of a debt of five hundred ticals, due by Kyau Pee Tee to his late father. As the cattle were not the property of Kyau Pee Tee, I explained to him that the theft was clear, despite his excuse; he then said that he did not steal them, but took them for the value of a gold sheathed dha which Kyau Pee Tee had purchased of a man who had stolen it from him. As I could not admit this in extenuation of the crime, he cast about for some more valid excuse, and then plumply denied the theft altogether; he was, in fact, in despair for a good excuse, and, having failed in all, he at last reluctantly consented to restore the stolen cattle.

If amused with my friend the cattle-stealer, I was in a greater degree annoyed with the Shan MOUNG HPPOO, who opposed so many "buts" to the simple terms under consideration, that I lost all patience, and threatened to send him to negotiate the affair in person with Kyau Pee Tee. This had the desired effect, and cut short his objections, but each day brings evidence of the pernicious influence which this man's agency exercises over the Karen chiefs.

Having so far arranged matters, I sent the agent MOUNG HPPOO with presents to Kyau Pee Tee and the Karen chiefs, intimating my intention of returning to the village of Kyay-hpo-gyee to-morrow, and instructed MOUNG HPPOO to inform them of the willingness expressed by the chief men of NOUNG BELAI to conform to the proposals I had made.

Thermometer 6 A.M. 50°; 2 P.M. 77°; 6 A.M. 65°.

Jan. 3.—The agent MOUNG HPPOO returned from Ngwai Toung yesterday evening, bringing many complimentary messages from Kyau Pee Tee. He, however, appears to entertain some doubts of the acquiescence of the Karen-ni chief in the terms of the proposed arrangement, but promises his best agency to accomplish it.

Returned by the same road to the village of Kyay-hpo-gyee. On

looking back at the beautiful scenery from the first elevation above the plains, I was surprised at the numbers of cattle that were grazing in groups below; several thousands, of which buffaloes and ponies formed a considerable portion, were within view, and on the sides of the hill, upon which I stood, a flock of goats were browsing in the stubble, all in the best possible condition, some of the males being larger and stouter than any I have ever seen. In fact, of black cattle, buffaloes, goats, and pigs, a lean animal of either kind is an exception to the general rule; and from the nature of the climate and the peculiar richness of the vegetation I feel convinced that the whole country, but especially the hilly portion, would prove a sheep and horse breeding locality of the very best description.

Thermometer 6 A.M. 50°; 6 P.M. 77°.

Jan. 4, Sunday.—During the day a party of Shan traders with 430 laden bullocks arrived from the northward, and encamped near the residence of the chief Kyay-hpo-gyee. I sent a message to the head men requesting them to pay me a visit during the course of to-morrow.

Thermometer 6 A.M. 56°; 2 P.M. 68°; 6 P.M. 61°.

Jan. 5.—The chief men of the Shan traders came to my tent as requested, and on being informed that a new road direct to Toungu was opened, by which, should they wish to go to that place, I would send an escort with them to protect them through the localities of the Yaings, they stated in reply that they came from the eastward of Karen-ni and had engagements with the merchants of Shwai Gyeen, to which place they confined their traffic, but that in future they would visit Toungu. They bring the usual assortment of Shan articles, *viz.*: dhas, hoes, spear-heads, plough-shares, and other articles of ironware, jackets and trowsers, coarse tameins, and raw silk principally, with beads and rough silver ornaments for the Red Karens. They remain here for a few days to collect stielac from the Red Karens to carry to Shwai Gyeen.

Thermometer 6 A.M. 53°; 2 P.M. 66°; 6 P.M. 60°.

Jan. 6.—The heads of villages and others of influence from NOUNG BELAI and this vicinity assembled to-day to sign the agreement to effect a reconciliation with the chiefs of the eastern Karens. Each individual had his own grievance to advance and particular wrong to redress, until, after a wearisome repetition of the good effects to result to them by adopting my propositions, they at length gave in their consent and signed the document; but a difficulty then arose on the matter of the restoration of the thirteen heads of cattle lifted from Kyau Pee Tee's village. The sons of the old chief now brought forward a claim to them on the part of a relation who, about a year ago, was seized, when on the Mohyay

frontier, by a party of Kyau Pee Tee's people, conveyed to the residence of that chief, and detained a prisoner by him until ransomed by the payment of five viss of silver; the reason being, as stated by Kyau Pee Tee, that the individual in question had been the chief agent in opening a road to Kyauk Gyee by which the Kallahs were to come and take possession of the country. They claimed, therefore, the restitution of that sum by Kyau Pee Tee before the cattle were returned. To this argument I replied that the reasons for the theft of the cattle which had been given were as various as the animals in size, sex, and colour; that I had accepted the promise for an unconditional restoration in good faith, and in the same good faith had intimated to Kyau Pee Tee the intention to restore them; and now were I to advance a claim of which I had not previously been made aware, he would naturally conclude that I was equivocating, and place no confidence in anything that I had said; that their persistence in the detention of the cattle for the reasons given would render my agency abortive, and that viewing the matter in hand as ineffectual, I should forthwith prepare for my return to Toungu. After another lengthy consultation, tempered by frequent applications to the Koung Yai bottle, they gave in their decision to the effect, that what I had said was right, and that they would restore the cattle on Kyau Pee Tee's consenting to sign the agreement as they had done, in which decision, as indicating a sincerity on their part to meet my views, I could but concur.

Thermometer 6 A.M. 57° ; 2 P.M. 70° ; 6 A.M. 60° .

Jan. 7.—The Karen messengers whom I sent to Toungu with despatches from halting-place on the Poug Loung (16th December) returned yesterday by the road farther to the south, along the course of the Khai-ma-hpee-khyoung, which road they say can be made with little labour more practicable than the one by which we came. They bring no letters from Toungu, stating that the regular messengers had left Toungu with despatches for me six days previously to their arrival there. I have now been without communication by letter with Toungu since the 17th November, and fear that the Yaings of the Karen-ni side of the main ranges have molested the messengers, or frightened them from attempting the passage across. To ascertain the cause of the detention, I send a party of Karens, who say that they are sufficiently acquainted with the tribes of Yaings on this side, and will have no difficulty in inducing them to let the messengers pass without hindrance. It is the custom of the Yaings to extort a present from all passengers through their locations, and Shans and others proceeding in small bodies of three or four usually leave their gounng bounng or jacket in the possession of these barbarous toll-gatherers. It is therefore probable that the wax cloth packet containing despatches may have

excited their cupidity and caused a demand for a portion of the contents, which the messengers have not acceded to, and so they, if not detained, have returned to Toungu.

The Karen messengers inform me that they were detained by a chief of the Red Karens, whose village is on the line of the trading road to the Salween, at the southern extremity of the country, by name Hpo Khai, who behaved very rudely to them, and finding that they were disciples of the Karen Missionary Qua Lah, intimated that he would not allow of the Yaings of his locality receiving instruction, or of the residence of a teacher among them, and that he would attack any village which permitted it. He also informed them that he would attack me, should I attempt a passage through his domains, and that he acknowledged no authority in the country but that of Kyau Pee Tee and his party, who he knew would be glad to hear of my death; that he had no care for the consequences, and so on. As this brave occupies a portion of the country in the west, within the border of the old chief Kyay-hpogyee, I sent for the chief's son and informed him of what I had heard. He said that Hpo Khai was distantly related to him, and that he would send a messenger to request him to come and meet me here as the others had done.

Thermometer 6 A.M. 57°; 2 P.M. 70°; 6 P.M. 64°.

Jan. 12.—Having sent a party in search of the missing Karen messengers from Toungu, they returned this morning, bringing the long-delayed despatches, which they found at a Karen village, to the west of the boundary range. It appears from their story that the regular messengers, after reaching that village, had been frightened from attempting the passage across the boundary-range by a report of my having been attacked and killed by the Yaings on the eastern side, which report having been *confirmed by the augury of the fowl's bones*, they deposited the packages with the headman of the place and departed with all haste to their homes.

On my return from investigating the formations in a deep ravine at some distance from camp, I came suddenly upon a party celebrating a feast to the spirit of the fountain. In a shady grove of spreading banyans, from amid disrupted fragments of limestone, the clear water pours forth a never-failing supply to the neighbouring villages, and close to its margin a Nat house of the usual construction had been built. On my approach the musicians were so absorbed in their performances that they did not observe my presence until close to the Nat house. When they saw me, however, so close to them, they set up a succession of yells, beat the gongs and drums with more than ordinary energy, and passed round myself and the Nat house with such ludicrous movements that I could not refrain from laughing, in which they heartily joined, until I withdrew myself to a raised space above the fountain, where

I stood silently watching the proceedings and the process of sacrificing a young pig. After examining minutely the tall trees for orchids, I left the spot on my return to camp; but as I left, the musicians stopped their din, and, accompanied by all present, followed me to the brow of the hill of the fountain, and there they stood watching me until I disappeared beyond a distant rising ground. As these people were in the daily habit of passing close to my tent, and had, as I supposed, satisfied their curiosity, I was desirous of ascertaining the cause of this extra excitement of their curiosity when at the spirit fountain. I was then informed that in consequence of my sudden appearance at the feast, at the exact point of the conclusion of the little pig's dying song, the worshippers had regarded me as the visible incarnation of the Nat, which was strengthened by my scrutiny of the trees from which they expected to see me take flight; and although disappointed in this respect, they kept their gaze steadily upon me until I disappeared over an intervening eminence, with the full expectation of seeing me spread my wings and fly away. Such is the pitiable state of superstition which clouds the faculties of this benighted race.

Jan. 13.—The agent Moungh Hpoo returned from Ngwai Toung with the agreement unsigned by either Kyan Pee Tee or the chief of the Eastern Karens. The reasons given for this decision were, that by signing the document they would become responsible for all acts of violence committed by their people, among whom were many evil-disposed persons who acknowledged not the authority of the chiefs; and although they concurred in the good intention of the document, and the beneficial effects likely to result therefrom, they could not, under the circumstances, sign it. There is, doubtless, much truth in their statement affecting the disposition of the Eastern Karens, but the circumstance of their unwillingness to effect a reconciliation with their brother of the western division arises, I am of opinion, more from Burman influence than their own spontaneous feelings.

I desired the agent to inform Kyay-hpo-gyee of the result of the negotiation, and of my intention of returning to Toungu.

Jan. 14.—In consequence of my message to the chief, he with his sons and the headmen came to my tent during the morning. They said that their hearts were sinking at the prospect of my leaving the country, as my absence would be the signal for the Burmese and Eastern Karens to recommence their system of annoyance; and that as I had no power to take the country under our protection, they were desirous of writing their wishes to the Governor-General of India and the Governor of Pegu. In reply I pointed out that the agent would remain, through whom all occurrences which their fears suggested would be made known to me, and through me to the Governor of Pegu, to whom also any

letter they wished to forward on the subject they had mentioned should be duly delivered and supported by remarks favourable to their propositions from myself, which appeared to satisfy them.

After occupying the tent for several hours, I was rather startled at the invitation of the old chief that I would perform the ceremony of establishing a brotherhood of blood between us according to the customs of his race, and not only between our two selves, but with all the other chiefs of inferior grade of the Western Karens. I accepted his proposal, anticipating a rare treat to the Pioneer Oo-Twai,* but forgot at the time that I had sent him with despatches to Toungu: however, I transferred the business to the agent Moung Hpoo, who declared his willingness to perform the operation; but on my proposing the substitute, I was again thrown back upon my resources by the intimation that Moung Hpoo's agency might do for the inferior chiefs, but between two such "great men" as ourselves the interchange of each other's blood alone would suffice. Finding myself in a fix, with a very disagreeable operation staring me in the face, I suggested that, as the other chiefs would be better pleased by participating in an ordeal on equal terms, some other than the blood-draught be substituted, if in their ancient customs such an one existed. To my great relief it was stated that the flesh of a bullock killed and eaten by both parties, each party receiving one of the horns of the animal, was a rite considered by them of equal weight with that of the blood-draught, and usually performed by them when a number of persons became friends and brothers. I of course assented to this ordeal, which implied that like as we had partaken of the bullock's flesh which had entered our bodies, so might our friendship mutually enter each other's hearts, and there steadfastly remain so long as the horns remained crooked.

The chief and party returned to their village after informing me that they would send messengers to assemble the other chiefs to the feast of the bullock, and requesting me to defer my departure until their arrival.

Range of thermometer for the past week, 57°—73°.

Jan. 16.—The chiefs and head men of the Western Karens having assembled, the bullock was killed by the Mussulman Jemadar of the elephants, to enable the whole party to partake of the flesh. The chiefs each carried away their portion, and one of the horns was duly delivered with much ceremony to me. I suggested that both the horns should be given to me for the purpose of getting them ornamented in silver, the one for the chief being returned to him: to this he assented, giving both the horns into my charge,

* See note 3, at page 212.

and saying that the one in my possession should be as a token of amity for ever between myself and the Western Karen chiefs, and that its possession by any other individual who might receive it from me would entitle him to the same attentions and consideration as were due to myself.

Jan. 17.—Escorted by the son of the chief we commenced our route homeward, taking a line across the undulations to the main trading-road, in which many large villages were passed, whose population were busy in the fields preparing the land for the next season's crop, the women forming by far the larger portion of the labourers; some with children slung upon their backs were working lustily with the spade-hoe, apparently suffering no inconvenience from the burden.

Course to the main trading-road s.s.w.—distant 6 miles.

Along main trading-road to halting-place on the Nan-pai Khy-oung, south—distance 11 miles.

Sunday, Jan. 18.—Halted for the day; ascertained the height by boiling-point to be 2763 feet.

Jan. 19.—The road from the Pass into the undulating portion of the country (at 5 miles north of halting-place) lies along the base of a congeries of low hills, much broken until passing the main range of limestone, when it becomes more level and continues for a distance of 15 miles south to the Salween, and thence across high ranges south to Kyouk Gyee and Shway Gynee.

Course to-day down the stream Nan-pai, crossing it several times, to its junction with the Poug Loug, which forms the boundary of Kyay-hpo-gyee's country to the south. Both on the Nan-pai and the Poug Loug a large quantity of teak was seen in process of being dragged to the rafts in the latter. The trees consisted chiefly of fine young timber of small size, and by far the larger portion green: it is cut indiscriminately by the Karens for the sake of the three rupees per log, which they receive from the purchaser.

Course s.—estimated distance 10 miles.

Jan. 20.—Course to-day of a similar character as yesterday, along the flanks of low hills, and crossing the drainage into the Poug Loug repeatedly. Left the main road at 5 miles from last halting-place and diverged to the west along a path made by the elephants in dragging the timber. In the more inaccessible parts of the hills the teak forms the principal forest vegetation, and many magnificent trees are there untouched, in consequence of their isolated locality. At a rough computation many thousands of such trees were passed on the line of march, each worth in the log from 50 to 800 rupees.

Course along the main road, s.—5 miles; ditto up to the halting-place in the jungle, s.w.—4 miles.

Having sent on the agent, Moungh Hpoo, to the Karen-ni chief, Hpo Khai, mentioned in the notice of the 7th instant, he returned this evening, bringing a message from the chief to the effect that he was subordinate to the chief of the Eastern Karens, without whose consent he dare not subscribe to the agreement signed by the western chiefs associated with the Kyay Hpo; but that in return for the friendship I had evinced in sending presents to himself and Fa Ban Galay, he would direct the Karens under his authority to afford every assistance to the Shan traders who might follow the road I was opening to Toungu: he cautioned me against the treachery of the Yaings, who he said were no better than jungle-dogs. As nothing was said about his intention of molesting me, I concluded that the report of the Karen messengers was a bit of harmless bravado which he had indulged in at their expense. A Burman, who acts as agent for the chief with the timber-traders from Moulmein, accompanied Moungh Hpoo to pay his master's compliments; he also warned me against the treachery of the tin-working Yaings, who he said had threatened to exterminate me should I attempt the passage across the mountains in their direction. I told him to tell Hpo Khai that I was used to such threats, and that I found it the safest plan on all occasions to proceed to the point from whence they came, and such I intended to adopt on the present occasion, and, with the assistance of the Yaings themselves, open the old trading-road to Toungu, by which the traders were anxious to proceed, with the object of obtaining a supply of tin as a portion of their investments.

From this point it became necessary to cut a road along the line of the old trading one, which was in many places obliterated and for the most part covered with high brush-jungle. The following are the days' routes in succession, the line crossing distinct ranges of hills involving a variation of altitude daily of from 1200 to 3500 feet:—

Jan. 21.—Course to top of range, s.w.—1 mile; ditto s.w. by w.—1 mile; ditto s.—2 miles; ditto s.w.—2 miles.

Halting-place on the So-lo-lu, mountain-stream falling into the Khai Mahpai.

Jan. 22.—Course ascent, s.w.—1 mile; ditto w.s.w.—2½ miles.

Halting-place on the Thee-lu, mountain-stream falling into the Khai Mahpai.

The road to-day through the Pine Belt, at a height of 4500 feet.

Jan. 23.—Course s.w.—2 miles.

Halting-place at the Yaing village of To-lo-lu, the site of the tin deposits.

From the halting-place of yesterday the line of road had been cut up the steep face of the hill, too difficult for the elephants; it therefore became necessary to select a more accessible point and

open it as we proceeded along, the elephants being of great assistance in trampling down the high grass-jungle and cane-brakes.

It was my intention to have remained here for a day to examine minutely the tin deposits and the associated rocks; but as the mountain-stream from which the supply of water is obtained was at a considerable distance, I was compelled to make a hasty inspection of the locality during the few hours of the afternoon.

Proceeding with a party of Yaings to the tin-workings, I found that both sides of the water-course consisted of a blue indurated slate, in which lines of quartz of varying dimensions penetrated, and at the junction of the planes of the two rocks the ore (peroxide) formed irregular lodes, the quartz being more or less impregnated with the metal. Specimens of the quartz show long crystals of schorl accompanying those of tin, and in the washed ore obtained from disintegration of the rock at the bottom of the lode I found "wolfram," black sulphuret and cubic iron ores, with a few minute particles of malachite, giving sufficient evidence of the existence of that ore (carbonate of copper) in the stanniferous slate of the main formation. With the exception of the open spaces worked into the quartz lines, the whole surface was so thickly clothed with jungle vegetation, that no connected observations of the locality could be made; but from the numerous fissures indicating the points of deposits worked by the Yaings, there can be no doubt but that the ore is extensively distributed throughout the whole clay-slate system of the locality.

The process of working the ore, as followed by the Yaings, is rude in the extreme. Following the lines of quartz that show the largest amount of wastage, with a small iron spud they separate the crystals of the ore from the matrix, which, with the deposited debris on the floor of the lode, they wash and smelt in small furnaces, cut out of the hill-side, of sufficient capacity to contain two to five viss of the ore. Green wood and charcoal form the fuel used in reducing the ore with a flux of limestone; but the process is so inefficient, that at least one-fifth of the metal remains in the scoria. These deposits, if worked by Chinese or Shans, even with their inefficient method, would prove an inexhaustible source of wealth to the undertakers.

Jan. 24.—Course from halting-place up the drainage of the central main range to the height of 4800 feet; then along the ridges through pine-forests to the point of the separation of the watershed 4 miles: that to the eastward draining into the Salween by the Khai Mah-pee Khyoung, and that to the west into the Sitang by the Thouk-yai Khat and its affluent the Khye Khyoung.

Course w.—2 miles; n.n.w.—4 miles.

Halting-place in the jungle at one of the sources of the Khye Khyoung.

Thermometer 10 P.M. 38°.

Sunday, Jan. 25.—Halted for the day; found the height of our position to be 3297 feet.

Jan. 26.—Course along spurs of the centre range, round the base of which, at the higher elevations, the drainage is still to the eastward, and from the level line of the road the hill-ranges of this day's march may be said to form a part of the main or central system.

Many Yaing villages observed on the line of march, their cultivations extending into the depths of the valleys, but their villages placed high up in the steep gorges for better security from the red Karens.

Course estimated w.n.w.—distance 8 miles.

From halting-place of yesterday the descent commenced into the valley of the Sitang, the road having been opened by the Yaings of Oo-Bo along lateral spurs from the main range. At a point on the line of march the plains of the Sitang, with the various bendings in the river and the city of Toungu, were visible through a break in the distant mural range of the valley; Toungu bearing w. by N. $\frac{1}{2}$ N.—distant about 35 miles.

Descent of altitude during the march 3200 feet, to the Christian village of Oo-Bo, on a feeder of the Khye Khyoung.

Course estimated w.—distance 5 miles.

Jan. 28.—Remained at Oo-Bo to pay the Yaings for their labour in opening the road on the west of the central range to this point, and to open the road hence to the Khye Khyoung, through the old cultivations by the elephants passing through, the grass and reed vegetation being so thick that the Karens object to the work.

Altitude of halting-place 1639 feet.

Thermometer 6 A.M. 53°; 2 P.M. 85°; 6 P.M. 68°.

Jan. 29.—Proceeded along the Loo Tsoo Loo mountain-stream and across a series of low hills which cover the flank of the main ranges to the Khye Khyoung, one of the main affluents of the Thouk-yai Khat, which is about 40 feet broad, coursing to the north-west over a very rocky bed with a swift current indicating a steep inclination; the road then led along the stream, crossing it many times, to halting-place on its left bank near a series of hot springs.

Course w. to Khye Khyoung—distance 2½ miles; ditto w. by N. down the stream—1½ mile.

Jan. 30.—In the early morning proceeded to examine the hot springs in the vicinity, which occur along a line of about half-a-mile on both banks of the stream. The water issues from beneath the granite-blocks composing the débris of the narrow valley at the margin of the stream. The temperature of the spring showed 99°, 125°, and 128° at the principal sources; the water having a de-

cidedly alkaline taste, leaving an ochrey scoriaceous froth along the line of its course, and depositing an alkaline salt on the stones in its vicinity. I took specimens of both the water and the deposited salt for examination, and endeavoured to obtain a section of the bank for examination of the accompanying formations. This I was not able to effect, however, as the water, percolating very copiously through a loose granite-sand, filled up the excavation as fast as it was dug out. The fragmentary rocks, associated with the granite, were blue and white quartz, clay jasper, and indurated slates of the Silurian system, with occasional nodules of a ferruginous sandstone, similar to the formation of the main range of the locality.

Altitude of hot springs 546 feet.

Moved camp to the village of Nau-thu-doo, on the secondary range, the road being excessively steep in some parts, causing much delay and labour to the elephants.

Course w.—estimated distance $2\frac{1}{2}$ miles.

Jan. 31.—Proceeded to the top of the range and encamped at the Karen village (Christian) of Baugalee, from which point the Sitang valley is seen beyond the ranges which stretch far into the plain, the city of Toungu bearing west, distant about 25 miles.

Course for the march w.s.w.—distant $5\frac{1}{2}$ miles.

Height of position 3300 feet; thermometer range 63° to 79° .

As my present camp is within easy communication with Toungu, and many circumstances combine to render a short stay here necessary, I now close my journal of the tour; but, in doing so, a few brief observations of the objects in relation therewith will not be misplaced.

Both as regards the passage outward as well as on my return, it will have been seen that many tribes of wild Karens have been met with, of whose very existence the Burman Government had no knowledge; nor is this surprising, when it is known that the Karens of the locality, from which I now write, although within the space of a day's journey, were regarded by that Government as Yaings, or uncivilized people of the mountains, from whom no revenue could be obtained, and in common with the whole race were hunted down without remorse and carried into hopeless slavery. Nor was the Burman Government the sole agent in these atrocities; tribes of Karens, differing but slightly in language and general characteristics, but more accustomed to intercourse with the inhabitants of the valley, were incited by the Burmese officials to emulate their own ruthless acts, until by the commission of attacks, plunderings, and seizures of the persons of their weaker brethren, a system of retaliation and inter-tribal blood-feuds was created which strengthened their distrust, separated their communities widely from each other, and in the absence of all check upon their vicious propensities,

maintained the state of implacable enmity amongst the tribes, which it was the object of the Burmese to effect.

It might be considered too sweeping an assertion were I to say that the state of social relations, as above noted, has passed away generally; but I may safely aver that of the large communities of these wild races who people the mountain-ranges of the Pong Loun, aggregating a total of from 55,000 to 60,000 souls, fully one-third have during the past three years received the light of civilization through the combined agency of government and the Karen Baptist Mission, with the missionary Qua-lah and his assistants—have cast aside their former evil practices, and, cemented by a bond of amity and brotherhood with their kindred tribes, have raised themselves in the social scale by the adoption of Christianity, and will eventually be found willing recipients of our laws to render them useful subjects of our Government.

NOTES.

(1). The large and valuable trade of the Shans from the territories lying to the north-east of the Burman Empire (and who are, west of the Salween, tributary to the Burman Government) has hitherto had its course through the Burman district of Kye-toung, to the north of Toungu, thence through the valley of the Sitang to the ports of Rangoon and Moulmein. The heavy exactions, and other vexatious imposts, however, to which the traders were subjected by every petty official on that route to Toungu induced the chief traders to essay the long established route through Karen-ni into the Shway-gyeen district, thus avoiding the northerly road via Kye-toung to Toungu. On the first occasion, two years since, much difficulty was experienced owing to the rapacity of the chiefs of Karen-ni, who, following the example of the Burmese, levied arbitrary imposts on the merchandise as it passed through the country; but in consequence of a friendly correspondence having arisen between the chief Kyay-hpo-gyee, the Deputy Commissioner of Shway-gyeen, Captain Birdmore, and myself, wherein we pointed out the great advantages that would result from a free and unrestricted course of trade through his territory, that chief permitted the traders to pass on payment of a stipulated tax upon each bullock load. Captain Birdmore at the same time having opened the road by the eastern ranges of the Pong-Loun into his district, the Shans with their merchandise, to the amount of from four to five thousand bullock loads, have passed on their annual trading expeditions to the coast by that route.

The object of the present undertaking is therefore to open a road east from Toungu through the ranges of the Pong-Loun, striking upon the central trading road into the Shway-gyeen district, by which the traders may come direct from Karen-ni to Toungu, and so avail themselves of a market for their goods which is at present lost to them by the long détour to the southward of Toungu via the Kyouk-gyee and Shway-gyeen road.

(2). These two men belong to the converted Christian Karens of the American Baptist Mission, and are in the employ of Government as Na-Khans or agents to the tribes of (wild) Karens in the vast mountain region of the Pong-Loun, many of which are in the most degraded state of uncivilization. They accompany me for the purpose of acting as a medium of communication with these tribes through whose locations it will be found necessary to open the road.

(3). The nature of this individual's position in our party requires a few words in explanation of the sanguinary appellation conferred upon him. In the foregoing note I have alluded to the tribes of wild Karens which inhabit these mountains, for the most part a turbulent and vicious race, who are in the habit of making forays on other tribes, seizing all the individuals they can, and selling them into slavery to the Red Karens on the Salween River:—thus they are the dread of the more peaceful tribes, who however lose no opportunity of inflicting a severe retaliation upon the Yaings. Under this state of feelings towards each other it is a natural deduction that the man-stealers should live in constant fear of attack, and only to those who have sworn brotherhood do they grant permission to pass their locations unmolested.

The ceremony of this interchange of fraternity is either by sucking a portion of each other's blood from a puncture in the arm, or by infusing a drop in water and drinking it, the chief of the tribe being the operee as brother to the stranger. It was during a previous tour among these tribes that I found it necessary to conform to this custom, as without it the tribe refused permission to pass their lands, and I should have been necessitated to draw blood by a sharper process, and so closed our chance of friendship for ever. Under these circumstances, having been allowed to nominate a substitute for the process, the man Ootwai offered himself, was accepted by the chief, sucked his blood, and cemented our brotherhood for life. And now that we are proceeding through mountain fastnesses, the residence of these wild tribes, the bloodsucker accompanies the party as pioneer: hence his title should be with more justice the "peacemaker," the blood sucking process being the means to that end.

(4). For their better security against sudden attack the whole of the tribes of Karens of these mountain ranges live together under one roof, each family having a small space partitioned off from the others; sometimes as many as 300 to 400 souls are thus herded together, who acknowledge the authority of a chief of the house, *eng-thoo-gyee*, but do not adopt the social system of property in common. In answer to my inquiries I learnt that in their cultivations, each family with its collateral branches plants a separate plot, the produce of which is housed in a granary of their own and forms their subsistence. And in reply to my question, whether any provision was made for the old, decrepit and sick members of the community who possessed no immediate relations, I was told that during the Burman time so great was the insecurity attending their very existence, that their hearts were hardened against affliction, and pity for the distressed was rarely shown, so that a man possessing nothing lived upon the roots of the field until nature became exhausted, when he died; others again who evinced a disposition of shirking labour and became a burthen or otherwise troublesome to the community were sold to the Yaings of the eastern ranges, but that since the teacher had appeared amongst them and they had heard also from my own mouth that the time of oppression and tyranny had passed away, a better state of affairs had obtained with them, and that charity as a divine precept taught them by the teacher was observed by all the tribes professing Christianity.

While waiting for the passage of the elephants up the steep ascent, I was amused to observe the whole of the inhabitants of the village swarming up the side of the hill to where I stood, and forming a line along the path. Thinking that it was a simple act of curiosity that brought them out, I stood for a short time watching their proceedings, and on my moving forward to ascend the hill an old man who was in the last stage of emaciation from asthma came forward with solemn pace and placed his hand in mine, giving me the up and down movement of a pump-handle shake, and then followed the mass of old and young, male and female, from the baby slung on its mother's back whose little paw was drawn across her shoulder and with her own proffered for the shake. I groaned in spirit at the task before me, but making a desperate effort I plunged

into the mass, grasping as many fingers as I could collect at once, performed the one, two of the pump-handle, and so on with a fresh batch until I completed the whole, blessing myself at its conclusion. This custom of hand-shaking has been introduced by the Karen teachers, who are indulged in the luxury by the American Missionaries; in fact it would appear to be a formula of their national creed. In the instance to which I now refer, however, it is decidedly *inconvenient*, as I can safely aver that not a single individual of all that crowd of humanity which passed my hands was free from a certain cutaneous disease not to be mentioned to ears polite, and those not enjoying the veritable *chose*, if any there were, had the scaly skin disease (a form of leprosy, I believe) so loathsome to the sight. In fact a more uncleanly mass of humanity than these embryo Christians I have rarely met with. In talking over the matter of this propensity to dirt with one of the Na-Khans and pointing to the healthful mountain-streams which a bountiful Providence had placed there for their use, he said that it was a deep-rooted superstition which prevented them from the use of water, to which they attributed sickness and death.

Surely with the symbolical rite of their initiation into the Christian faith as taught by the Baptists it were equally merciful to inculcate with these poor wretches the cleansing of the body by the same element, by which much of the sickness they suffer might be averted; and if by such teaching they could be brought to appreciate the use of soap occasionally, more valuable by far than either Godfrey's Cordial or the Balm of Gilead, it would prove a real blessing to infants as well as mothers, some of whom (infants) slung at the backs of their mothers were covered with blotches of the disease.

After bidding adieu to the unclean lot, the pioneer Oo-Twai gave me the gratuitous information that the disease was catching, and that was the reason they all enjoyed it, living as they did all together in one house. I took the hint, however, and on my arrival at the next mountain-stream had a good scouring with sand of the honoured "manus," and deputed the pioneer to stand hand-shaker for me on all future occasions of the kind.

(5). Throughout the whole of the tribes of the mountain races included between the Salween and the Sitang rivers a passion for the possession of these instruments (Kye-dzeis) predominates. To such an extent does it operate with some of those of the more secluded valleys of these mountains that instances are by no means rare of their having bartered their children and relations for them. A superstition, common to all mountain tribes which I have met, that the deep-sounding note of a monotoned instrument propitiates the presiding Nats (genii) of the mountains, and averts evil from them, is a reasonable enough cause for such a propensity to possess them, and those tribes who have the greatest number are regarded as the more powerful. In all their gatherings, whether for peaceful enjoyment or preparatory to an expedition to some intertribal bloodfeud, the Kye-dzeis are brought forth and beaten, and as the resonance echoes back from the deep gorges of the mountain glens they regard it as the approving answer of the spirit, become excited by drinking a spirit rudely distilled from rice, and a scene of the wildest revelry ensues.

I have a sketch of a Kye-dzei, an heirloom of the tribe of May-ga-doong, which gives an idea of the form of these gongs or drums, which are slung round the centre and beaten with a buffer, or, like Hudibras' "drum ecclesiastic," thumped with the fist instead of a stick at the large end, the smaller one being open as represented. They are made by the Shans of a metal consisting of copper and spelter of about a quarter of an inch in thickness, and profusely ornamented in a rude style on the surface of the cylinder with small figures of animals, elephants, frogs, monkeys and dogs, principally, projecting therefrom. They vary in size, some being much larger than the one represented, and are valued accordingly from 50 to 500 ticals of silver.

(6.) I was assured by the chief of the Ley-pya-gyees that these instruments were the originating cause of all the intertribal feuds which at present existed amongst them. The loss of one by theft, or from having been lent to another tribe and never returned, was a cause of revenge handed down from generation to generation, and until satisfied either by the exchange of a man stolen from the indebted tribe or a Kye-dzei to replace the lost one, a cause of enmity would ever exist between them.

(7.) One of these men from the eastern locations of the central range with several of his people had features so remarkably Chinese as to make the difference of race between them and the Yaings of Karen-ñi at once obvious and distinctive. On inquiry I found that they were almost an isolated class from their position in the higher valleys of the central range, and were regarded by the Yaings as a ferocious and turbulent race, living in constant hostility with the surrounding tribes whom they seize and sell into slavery; they professed a sort of nominal subservience to the authority of Kyay-hpo-gyee, but paid neither tribute nor tax of any kind. Their language is a dialect of that spoken by the whole of the races of Yaings, but local differences in this respect are common even in separate communities of the same tribe (as will be seen in a subsequent note). I am of opinion, however, that the various tribes at present inhabiting this mountain region have found refuge here from the tyranny and oppression characteristic of all the despotic governments on the north and east; and that in common with the Karens—or the generic term for a people who at some distant period were driven from the upper waters of the Irrawaddy—Shans, mountaineers from the north-west frontier of China and Siam, more especially from the Siamese border provinces east of the Salween river, have at various periods planted themselves in its fastnesses, and in the course of succeeding generations have become in a great measure amalgamated.

(8.) It is a peculiar feature of the intercourse between the Karens of these mountains, that each community (consisting usually of from 30 to 50 families) possesses a defined boundary separating the land forming the cultivation of each village. In general this is marked by a mountain-stream, in other cases by the line of hills surrounding their location carried down to the drainage at the base. To pass this line, which has been marked by the ancestors of the tribes, is deemed an aggression to be expiated only by the seizure of one of the individuals of the trespassing tribe; and where this has occurred in years long past the sense of grievance is kept alive by being transmitted to each succeeding generation, thus forming a prolific source of enmity and widespread alienation between sections of the same race. To such an extent did this prevail during the Burman government that many villages within sight of each other held no communication for years, nor would individuals of either village pass the boundary line of their cultivations under any circumstances except for the commission of some act of violence on its neighbouring community.

During the course of a conversation on the above subject with the Karen Missionary (Qua-lah) he reverted to the isolation of villages of Karens from each other as the operating cause of the diversity of dialect existing in their language; and this will doubtless be conceded if it be borne in mind that linguistic terms of ordinary import and in general use as idiomatic forms of expression have a cycle of transition even in the languages of Europe, and eventually become lost or so altered from their originality as to be obsolete in that form: how much more rapid therefore must the transition be in a state of society such as that described! To this cause must certainly be attributed the disparity of idiom which prevails throughout the whole Karen races where no foreign admixture has occurred, and this is found to prevail more especially with the tribes of Dyaks in Borneo under a state of social relations even more antagonistic than that of these tribes of the Karen race.

It would form a most interesting subject for ethnological research to trace the affinity, if any exist, between these mountain-races and the Dyaks of Borneo, of which the Kyans form the most numerous section.

(9). On the subject of the perpetual fear and dread of attack in which these poor wretches pass their existence, the Karen Teacher told me that it was the custom of some of the more barbarous tribes of the Pagoh for the women to keep watch during the night while the men slept, and that at early dawn each man with spear in hand made a minute inspection of the pathways leading to the village to ascertain whether any one had approached it during the night. On detecting the tracks of strangers they bent some of the leaves of the vegetation double near the footmarks to indicate danger to any of their community who chanced to pass.

On one occasion he was present at a Pagoh village when in the early night the alarm was given by two of the men who had returned late from their cultivations that the Yan-thai or marauders were approaching the village. All the people and dogs outside at once ascended the high platform of the house, drawing up the ladders after them: rushing tumultuously together within the house, they in concert with the dogs set up such shrieking that almost stunned the senses; during this diabolical hubbub, the attacking party had approached within the enclosure and were about to thrust their spears through the bamboo floor of the house to make the inmates descend, when, having quelled the noise and confusion, he told the men to depart, threatening to shoot them if they persisted in their attack: this having no effect, he fired off a small pistol which one of his followers usually carried, and in a moment all was still as the grave—the explosion had done its work, and the people of the house were freed from further molestation.

(10). This custom of interment of the dead, placing on and within the grave articles adapted to the consumption and use of the living, obtains almost generally throughout the Karen race; the difference, where it exists, being that of the method of disposal of the remains, some of the tribes using incremation instead of burial, but even in that case the bones or any remnants of them are carefully collected and interred with a portion of the valuables belonging to the deceased.

It may be presumed that a ceremony shrouded by a darkened and dread superstition has passed through many generations without any material alteration from the process of its normal institution: if so, it affords an unerring datum from which we may trace the origin of these mountain-races to the ancient Mongols, whose Tartar tribes, as far back as history carries us, used similar forms of sepulture, accompanied, however, by the sacrifice of life at the tomb. And if the doctrine of distinct races of men and their physiognomical peculiarities be taken as a medium of identification, then the almost perfect Esquimaux features and shape of heads which prevail generally, but in some of the wilder tribes more especially, mark them as the descendants of the ancient Tartar hordes who, as we read, swept from their inhospitable steppes across the regions of central Asia far into the plains of Hindustan, whence they have subsequently been dispersed into the more inaccessible mountain-systems of the Himálaya and its subordinate ranges.

I subsequently learnt that on the interment of any influential person a slave and a pony were secured near the grave, but not sacrificed; and, although bound with the purpose of preventing escape, they invariably released themselves from their bonds and escaped, the slave in such case regaining freedom from all previous claims.

Equally important as data of investigation with other rites and ceremonies is that of their superstitions and modes of procedure consequent thereon. That of angury by means of the bones of fowls as prevailing throughout the whole tribes is, I think, of the first importance in guiding such inquiry. The method

of proceeding as witnessed by me was as follows:—the leg and wing bones of the fowl on being cleaned were examined, each pair separately, and in the small apertures found on each a small piece of bamboo was inserted, showing the direction into the bone;—the inclination of the piece of bamboo in a uniform direction, the number of the holes in each bone, their evenness or otherwise, corresponding with the test of their own proposition before examining the bones, forming the reply negative or otherwise to the question involved. As many irregularities occur in these small air-passages, the course of the augury has a corresponding variety of signification, so that it requires an adept in the art of divination to read the oracle correctly.

(11). This labour of the women was brought prominently to my notice by a (Shan) Poon-gye (Buddhist priest) who resides here with the few Shans who have been compelled to take refuge in the place to escape from the persecution of their own governments. He said that during the rains at the period of planting their fields the women were occupied almost entirely out of doors, while the men remained at home to cook their own meals; that the females rarely enjoyed a regular meal during that period, and were content with a head of maize or a handful of kyeeek, millet, or other grain with which to satisfy hunger as they proceeded to their daily labour: they however are permitted the indulgence in the use of the intoxicating Kounng Yai and spirits, which they drink to excess on occasions of general festivity, and, with the aid of the never-failing pipe, evince a state of happiness and contentment not to be expected from their degraded condition.

(12). In the absence of all form of government of a protective character the Red Karens invariably carry arms, usually a light match-lock with a dagger in the waist-belt; in the absence of the former, from one to three light bamboo-spears with iron heads and a dha form the equipment of the adult male population, who are as prone to improve the opportunity for aggression on their neighbours as the latter are upon them: hence the necessity for the universal spear and match-lock which prevails; and I am informed by the Shans who have long resided in the country, that the Red Karens hold life very cheaply, and in their quarrels with each other on the most trifling occasions use their arms with deadly effect.

The uncontrolled licence of action which prevails throughout the whole country is a prolific source of aggressive practices on the part of the chiefs of villages, who, on occasions of their cupidity being excited by the information of coveted property in the possession of their neighbours, concert measures of attack with any volunteers who may offer, and mounted on their ponies in the dead of the night rush upon the devoted village, plunder it, set fire to the houses, and retreat ere the inhabitants have recovered from their terror. Mounted on their high stuffed saddles with match-locks slung at their backs they bear no bad resemblance to the marauding Cossack of the Don, to whom in disposition also the resemblance is no less striking.

February 1st, 1857.—As I anticipated, so it has occurred, the offending Yaings on hearing of the intention of the Myo-oke to visit them with an armed party for the purpose of carrying out my orders to effect the release of the man detained, came to meet him with the man whom they restored, and made many excuses for their former disobedience. Others of the same tribes who have hitherto been the dread of the weaker villages have also come voluntarily and placed themselves under our rule.*

* See "Brief Notices of the Tenasserim Provinces," by Mr. O'Riley. Bassein: pamphlet, 8vo., 1862.—Ed.

To illustrate the paper of
Spencer S^t John Esq.
H. B. M. Consul General for Buenos



XV.—*Observations on the North-West Coast of Borneo.* By
SPENCER ST. JOHN, Esq., F.R.G.S., H.B.M. Consul General for
Borneo.

Read, March 10, 1862.

*Physical and Political Geography of the districts lying between
Gaya Bay and the Tampasuk River.*

THE coast line, as viewed from the sea, presents the following appearance: Gaya Island and the shores of Gaya and Sapangar bays are hilly, and this continues to within a mile of the mouth of Mengkabong Harbour; the land there becomes flat, with the exception of the Tambalan Hill, as far as the mouth of the Sulaman Creek or river. High land then commences, which continues for a short distance beyond the Abai, when it again becomes low, and presents the same appearance for many miles beyond the Tampasuk River, the coast being fringed by casuarinas.

The mouths of the rivers Ananam, Kabatuan, Mengkabong, Tawaran, Sulaman, Abai, and Tampasuk, are all shallow and unfit for European vessels, the deepest having but nine feet at low water, and, with the exception of the Ananam, Kabatuan, and Abai, are much exposed during both monsoons, and are rendered dangerous by the numerous sandbanks that lie off their mouths. The Ananam in Gaya Bay, and the Kabatuan in Sapangar Bay, are only suited for native craft; the Abai has more water, and its mouth being sheltered, small vessels at certain times of tide might enter. Within, the water deepens to four fathoms, and is a perfectly landlocked harbour.

There are several bays along this coast which afford shelter for shipping. The finest of these harbours is that composed of the two bays Gaya and Sapangar, which is large enough to shelter, during both monsoons, every vessel that trades to the East. It contains within itself minor harbours, as one on the north-east of Gaya Island, which is deep (13 fathoms) and secure; and much fresh water may be obtained on its western shore. Lokporin, in Sapangar Bay, is also a safe anchorage, and is the proposed headquarters of the Catholic mission. The portion of the bay opposite Gantisan, the Malay town, though good for shipping, is not so suited for small craft, as squalls from the south-west raise a heavy sea there. Numerous coral-reefs jut out from the northern shore. This harbour is the most important in Borneo, from its commanding position in the China seas, and from its great security.

Good shelter may also be found in Ambong and Usukan bays, but I have not entered them myself; the next, Abai, affords excellent shelter during both monsoons, though open to the north-west. It is, however, of inferior importance, though fresh water

may be obtained in small quantities on the grassy plain at the entrance to the river. Water is rarely absent where the land is hilly; wherever the country is low, and occasionally elsewhere, there are sandy beaches. The west end of Gaya Island, Gaya Head, and the headlands between Sulaman and Abai, are rocky: beyond these appeared broad sandy beaches.

Passing the coast-line, the country presents varied forms. The hills that surround Gaya Harbour are low, some cleared at the top, bearing at present a rank crop of grass; others have a reddish tint, from the ferruginous nature of the soil; the rest are covered with jungle. On entering the Kabatuan, the banks are lined with a narrow belt of mangrove; but the hills rise immediately at the back, and this character appears to extend far into the interior both of the Kabatuan and Mengkabong. From the latter river to the Sulaman stretches a plain, perhaps seven miles in width, varied by a few very low hills. The country changes here, and broken ranges extend to the Abai; hill and plain are there intermixed; but as soon as we approach the Tampasuk, the country opens, and for Borneo, an extensive plain spreads out, reaching to the foot of the Muluda mountains: it is, however, occasionally diversified by low undulating sandstone hills.

This level ground is admirably adapted for rice-cultivation, as it is grass-land without any jungle. On leaving these plains, ranges of hills commence, rising for the most part with great abruptness, presenting steep sides and narrow ridges, and running for the most part in an east and west direction. There are, however, exceptions to the above description: a few of the hills have easy slopes, and many of the ranges are connected by cross ranges, running north and south, particularly at the heads of valleys, where the waters of the different tributaries flow in opposite directions, to join their main rivers. The highest of the hills we measured was about 3000 feet. The ranges towards the interior are higher, and at the back of these are very lofty mountains, including Kina Balu (13,698 feet according to Sir Edward Belcher); Saduk Saduk, about 6000; and others, whose names we could not obtain, estimated at about 7000 feet. All the hills in these districts that we examined consisted of sandstone until we reached Kina Balu.

Kina Balu, the highest mountain in the Archipelago, deserves a more extended description than I, from my imperfect information, can give. I will briefly notice the attempts that have been made to ascend it. The first was made by the Hon. Hugh Low, the Colonial Treasurer of Labuan; this was in March, 1851, when everything connected with the mountain was unknown: the route, the natives, the difficulties, were all to be studied and discovered; and, as no Malay had ever penetrated there, the journey, it was

generally thought, would prove a failure. However, Mr. Low succeeded in his enterprise, and reached the summit, though he did not attempt to ascend the rocky peaks that spring for a few hundred feet above the extended top.

The next attempt was made in 1856 by Mr. Lobb, a naturalist; but the natives refused to assist him, and he was unable to advance beyond its foot.

Mr. Low often planned another ascent, but various circumstances prevented him until April, 1858. As I was desirous to examine those districts, I had much pleasure in joining him. We chose the route by the Tampasuk River. On reaching the mountain, I was obliged to ascend it alone, as Mr. Low had so injured his feet as to be unable to walk. I reached the summit of the southern peak, and was mortified to find that both the east and west peaks appeared higher. The barometer having been destroyed by a fall, we could not measure the mountain. In the following July we made another expedition, to examine the country between Gaya Bay and the mountain; and though we both succeeded in ascending to the summit, the height was not fixed, as another accident happened to our instruments. With regard to the height of the mountain, various opinions have been entertained; but until some one is fortunate enough to reach its summit with a couple of good barometers, I think we may rest contented with Sir E. Belcher's measurement by trigonometry: he makes it, as before stated, 13,698 feet. Mr. Low, on his first ascent, had a very inferior barometer, while during the last two trips we were provided with two magnificent barometers by Adie, which Mr. Low had procured especially for these trips; but unfortunate accidents rendered them nearly useless. However, sufficient observations were taken to show that the first barometer was incorrect; and though both inclined, during our first joint expedition, to place the height of the mountain at above 11,000 feet, the last makes us feel sure that we underrated the height. I am therefore inclined, from all the observations made, to think Belcher is correct.

The summit of Kina Balu consists of syenite granite, which is in many places so jointed as to give it the appearance of being stratified: about ten peaks spring from a line running from east to west, while about half a mile to the southward rises another detached peak. Between the latter and the western portion of the former is an open space like a broad terrace, with sloping sides, down which huge granite slabs are continually gliding. The southern peak presents a very different appearance, according to the point of view: from the terrace it is sharp, not above a yard in breadth; while, from the east and west, it appears quite rounded—this renders it tolerably easy of ascent. On three sides it is perpendicular, while on the south it presents no material diffi-

culty. Without careful barometrical observations it will be impossible to fix on the highest peak: from several views, the southern, the summit of which I gained during the April trip, appeared as high as the others; while from the terrace, both the east and west appeared higher by perhaps fifty feet. The western peak has a rounded appearance, but we failed to discover a way of ascending its summit. I reached to within forty feet, when it presented only perpendicular sides. It is gradually wearing away before atmospheric influences, its northern base being covered with huge stones that have fallen; the summit is still overhanging, and much of it apparently ready to topple over. Between the western and eastern peaks, on the edge of the cliffs that overlook deep chasms below, is a wall principally of huge granite rocks; some so perched on the other, that at first sight it appears the work of man—geologically explained, I suppose, by the wearing away of the softer portions of the rocks around. Some of the peaks present the appearance of a thumb, while others are massive, as those that rise on either side of the spot where Mr. Low, in 1851, left a bottle with some writing inside. I found it in 1858 undisturbed, and would not break it to read the paper, but left it there to satisfy the curiosity of future travellers, and as a record of him who first ascended Kina Balu.

The summit is above two miles in length, and I observed that, in descending to its north-west and east spurs, the rocks assume a perfectly serrated appearance. Kina Balu extends a long distance towards the north-east or E.N.E., its height varying perhaps from 10,000 to 11,000 feet: this is partially divided from the parent mountain by a deep chasm. From the top we did not see it; in fact, the mist generally obscured the view, leaving but patches visible. The summit of the mountain, as I have before observed, consists of syenite granite, but every here and there it is crossed by bands of a white rock. For about 3000 feet below the peaks there is but little vegetation; the face of granite sweeps steeply up at an angle of $37\frac{1}{2}$. In the gullies and other sheltered spots are thickets of flowering shrubs, principally rhododendrons, a few even extending to the face of the peaks, particularly in the bottle gully.

From what we observed, the summit of the mountain can only be reached by the way we followed; I mean that portion above 9000 feet: to that spot there is said to be another path. Kina Balu throws out on every side great shoulders or spurs, which have also their sub-spurs: the principal are the north-west, very steep; and the w.n.w., which subdivides. On the west face of the mountain there are but minor spurs, which leave 5000 feet of precipice above them; from the southward two huge spurs extend. On one is the village of Kian; it springs from the left of the southern face, and after running south-west, turns to the west by west and subdivides.

The next spur that springs from the right of the southern face is in every respect the most important—it may be called, for the sake of distinction, the main spur; those to the left we could not fully observe, as we only saw them from above. The main spur runs at first to the south-west, for about five miles; it then preserves almost a s.s.w. direction for twenty miles, throwing off on either side many sub-spurs. A glance at the map will best explain this. This is the range that is observed from the sea, and gave the notion of a backbone to Borneo; but beyond these twenty-five miles it does not extend: in fact, mountain-ranges running to the east and west are distinctly visible; the first, at not a greater distance than twenty-six or twenty-seven miles, appears to cross close to the end of the main spur. If we were disappointed at not obtaining views from the summit, we were partially repaid by the clear view we had of the country lying to the south and south-east of Kina Balu. We were at an elevation of above 7000 feet on the main spur, and observed numerous mountain-ranges, whose bearings I will give:

High-peaked Mountain,	S. $\frac{1}{2}$ E.,	estimated 8000 feet.
Ditto	ditto	S.E. by E., estimated 7000 feet.
Ditto	ditto	S.E. by $2\frac{1}{2}$ E., estimated 7000 feet.
A Peak	.. ..	S.E. $\frac{3}{4}$ E., very distant.
A long-range Peak	..	S.E. ditto ditto.

The two very distant ranges are stated to be in the Kina Batangan country. Between us and the mountains bearing south-east by east (18 miles estimated) there was a grassy plain, perhaps three miles by two, on which were many villages: through this flowed a fair-sized river. We could trace its course as far as the third spur that springs from the main one; there a line of hills appeared to obstruct it, but beyond we could trace the course of a stream, which is probably its source. This river, it was stated by the people of the country, flowed into the lake of Kina Balu: it runs from the south-west to the north-east. With the exception of the plain above mentioned, and a marsh whose commencement we could observe north-east of the plain, all the country appeared hilly, and most of the land was cleared, and either under cultivation or showed the remains of former plantations. We could observe in the second valley two villages,—the first called Tu-han, the next Inserban: at both cotton is said to be cultivated. Many villages and detached houses were also observed, whose names our guides had forgotten. The route to the lake is by the above-mentioned villages; the names of those beyond are Penusub, Tambian, Paka, and Koporingan: these are stated to be on the route or close to the lake. A few words concerning this lake. That it exists to the east of the mountain appears from inquiry to be certain; its size it is unnecessary to estimate, though our

informant stated that, standing on one bank, it was not possible to see the opposite one: it cannot, however, be of the great size marked in the old maps, nor in the situation assigned to it, as the whole country from E.S.E. to the western coast was distinctly visible, and the Idaan expressly stated that it was farther to the north and east of the plain. I have before noticed, Mr. Low made many inquiries during our first trip, and we jointly questioned the Idaan on many occasions during our long stay at the Kiau village: they spoke of it as a certainty, many affirming that they themselves had been on trading expeditions to it. Petermann's map is entirely incorrect as to the position of the lake.

I must now make a few remarks on the vegetation that covers the mountain. Cultivation extends in a few places to the height of 3000 feet, but beyond that there is a fine jungle on the main spur to 6000 feet; it then commences to degenerate, and in the exposed portion of the ridge the trees are bent across the path, inferior in size and covered with moss; but above this height, in sheltered spots, the trees again increased in size. Above 7000 feet there were few fine trees, the vegetation changing its character, most of it consisting of flowering shrubs, ranging in height from ten to twenty feet; the trees, however, on the sides of the spurs continued of comparatively a large size until we had passed 9000 feet; at 10,000 the shrubbery became very straggling, and above that it was only scattered among the granite rocks. On the W.N.W. spur, called the Marei Parei, the vegetation even at 4500 feet was exceedingly stunted in many places, while above, in equally exposed situations, the jungle was of fair size; probably the nature of the soil may account for it, being formed of decomposed serpentine, containing much peroxide of iron.

Kina Balu appears to be the seat of the pitcher-plant, Mr. Low having made a magnificent collection,—some, perhaps, the most beautiful in the world. I will not enter on the botany, but refer to Mr. Low's account of his ascent in 1851, published in 1852 in the *Journal of the Indian Archipelago*, vol. vi. (very incorrectly printed). This, however, does not contain a description of all the pitcher-plants, as he was fortunate enough to find some new species during the last trip: one pitcher was large enough to receive the contents of two beer-bottles; another was 19 inches in length.

At the risk of repeating myself, I will make a few observations on each of the rivers that drain those districts. I have already remarked that the shallowness of their mouths renders them unfit for European commerce; the same remark might be extended, as the fresh water-streams soon become mere mountain-torrents. The Ananam I have not ascended; the Kabatuan is apparently a collection of salt-water creeks with a few fresh-water rivulets. The former town of Menggatal was situated about three miles up,

and only at flood-tide would float a frigate-barge; near the town the banks were grassy, and many cocoanuts were grown in the neighbourhood.

The Mengkabong also can scarcely be called a river,—it is rather a large salt-water lake with numerous islands, some containing hills of perhaps 500 feet in height: it is very shallow, many portions of it being dry at low tide, while others have but a few inches of water; it appears to be filling up very fast, and this, perhaps, affords a clue to the cause of the formation of the plains that extend beyond, which all appear to be composed of alluvial deposits. Many fresh-water rivulets drain the neighbouring hills, and pour their waters into this creek, but it is always salt: it extends perhaps for about five or six miles into the interior.

The Sulaman I have not entered, but I have seen it from the hills on many occasions; it presents the appearance of a lake, and is represented to be a salt-water creek. We could observe, by the rivulets that drained into the Tawaran, that the Sulaman has no interior.

The Tawaran, on the contrary, is a fresh-water river, even to its mouth, the flood-tides making but a slight impression on it. Large native prahus can safely ascend it for six miles; after that it depends on the state of the weather, rising and falling very rapidly, as it is influenced by the rains. The banks of the river as far as Bawang village are flat; there the hills commence, and, three miles beyond, the Tawaran divides into two branches,—one comes from the south, the other from the E.N.E. They immediately degenerate into mountain-torrents, and are then not used by boats: produce is occasionally brought down on rafts, but at some risk. Every range of hills affords the parent-stream a rivulet, but the Tawaran does not penetrate far into the country: its sources are apparently in the main spur of Kina Balu,—the east branch rising between the second and third sub-spur on the western side of the main spur; the southern branch appears very small. On both occasions that I passed the Tawaran it was of a dirty yellow colour, being filled with the detritus of the neighbouring hills. Land-slips are very common, and bring down a considerable amount of matter for the waters to carry seaward. The Tawaran is subject to very sudden inundations, the water occasionally reaching the houses at the village of Bungol, though, perhaps, fifty feet above the stream. There is no foundation for Dalrymple's story, which has been often repeated, of the Tawaran rising in the lake; it evidently has its source in the main spur of Kina Balu.

The Abai is a salt-water creek, but preserving more the appearance of a river; much of both banks are mangrove until we approach the houses. Its depth varies: on the bar it has but one fathom, while inside it deepens to four, and it has a channel

ticular type for one race. The Bajus of Tampasuk nominally acknowledge a Datu as their chief, who receives his authority from Brunei; but they never pay taxes to the supreme government, and seldom send even a present. They are individually very independent, and render no obedience to their chief unless it suits their own convenience. They are therefore disunited, and unable to make head against the few Lanuns with whom they have continual quarrels. Every man goes armed, and seldom walks; if he cannot procure a pony, he rides a cow or a buffalo, the latter generally carrying double: their arms consist of a spear, shield, and sword. Their houses are similar to the Malays', being built on posts, sometimes in the water, sometimes on dry land; in Mengkabong they are in the water, and are very poor specimens of leaf-huts. The Tampasuk not affording water-accommodation, the houses are built on shore: the only good one was the Datu's, which consisted of a planked house of two stories: the lower story, occupied by the married portion of the family, consisted of one large room with broad inclosed verandahs; the upper story was for the young unmarried girls and children. Of furniture there is little; mats, boxes, cooking-utensils, and bed-places being the principal. In these countries there are no public buildings; no offices, jails or hospitals, nor even a fort or stockade. The houses being built of temporary materials, there are no ancient buildings of any description.

Mixed with the Bajus are a few Borneans: in Gantisan they form the bulk of the village; in Mengkabong they are not numerous, while in the northern districts there are few, if any, strangers. An occasional Indian, Sidi, or Chinaman may be seen; but they are only petty traders, and return to Labuan after a short residence.

The principal inhabitants of these districts consist of the *Idaan** or *Dusun*, the aboriginal population: they are essentially the same in appearance as the *Dyak*, the *Kayan*, the *Murut*, and the *Bisaya*; their houses, dress, and manners are very similar, modified of course by circumstances. In the *Kabatuan*, *Mengkabong*, *Sulaman*, and *Abai*, are some tribes of *Idaan*, but I have not visited their villages; I shall therefore confine myself to those I observed on the *Tawaran* and *Tampasuk*.

On the banks of the *Tawaran*, where it flows through the plain, are many villages of *Idaan*, which are completely hidden by groves of fruit-trees; these men have a civilized appearance, wearing jackets and trowsers. As you advance into the interior, the clothes lessen; at *Kiau* there are but few to be seen, and beyond they are said to use only the bark of trees. Some of the tribes on the *Tawaran* have followed the Malay fashion of living in small houses suitable for a

* *Idaan* is the name given them by the *Bajus*, *Dusun* by the *Borneans*.

single family, while others occupy the usual long house, with the broad verandah, and separate rooms only for the families. The house at which we lodged at Ginambur, on the Tampasuk, was the best I have ever seen among the aborigines: it was boarded with finely-worked planks; the doors strong and excellently made, each also having a small opening for the dogs to go in and out; the flooring of bamboos beaten out was very neat, and free from all dirt, which I have never before noticed in a Dyak house, where the dogs render everything filthy. The Ginambur Idaan are good specimens of the aborigines: they are free from disease, and are clean-skinned; they have good-tempered countenances; none of the women are good-looking, still they are not ugly; all the girls and young women wear a piece of cloth to conceal their bosoms,—it was upheld by strips of coloured rattans; their petticoats were also longer than usual; the very young girls had the front of the head shaved. I did not notice that any of the men of that village were tatooed, but in our walk we had met parties of Idaan from the interior who were so; a tatooed band two inches broad stretched in an arc from each shoulder, meeting on their stomachs, then turning off to their hips: some of them had the band prolonged from the shoulder to the wrist. Many of their villages are extensive, as Koung, which is large and scattered about a grassy plain, and many houses also on the hill above: it is a very pretty spot, the greensward stretching on either side of the river's bank, where their buffaloes and cattle graze. This tribe has the appearance of being rich: they possess abundance of cattle, pigs, fowls, rice, and vegetables, while the river affords them fish. Kiau is also an extensive village, but the houses and the people are very dirty; on our first visit they were all suffering from colds, which rendered them unpleasant neighbours.

None of the Idaan pay any tribute, though many chiefs on the coast call them their people; but it is merely nominal, no one daring to oppress them: each village is a separate government, and almost each house independent. They have no regular chief, but follow the counsels of the old men to whom they are related: they have no wars to induce them to unite more closely; their feuds are but petty quarrels, and in but one house did I observe heads, and that was at the village of Tamparuli, in the Tawaran plain. The very fact of troops of girls working in the fields without male protection would prove the security that exists, though every man always walks armed. We had no opportunity of observing any of their ceremonies, and it is very unsafe to trust to the information of interpreters.

The aborigines in general are so honest that but little notice is taken of this good quality; however, to our surprise, we found that some of these Idaan were not to be trusted: we were warned

by the Bajus to take care of our things, yet we felt no distrust; but at Kiau they proved their thievish qualities, which, however, we frightened out of them, as during our second residence we lost nothing there. At the village of Nilu they made an attempt, which we checked at once.

The Idaan are essentially agriculturists, and raise rice, sweet-potatoes, the kiladi, an esculent root, yams, Indian corn, sugar-cane, tobacco, and cotton: the sugar-cane is only raised for eating in its natural state, while the cotton is confined to certain districts. I first saw the natives ploughing in the Tampasuk: their plough is very simple, and is constructed entirely of wood; it serves rather to scratch the land than really to turn it over. The plough was drawn by a buffalo, and its action was the same as if a pointed stick had been dragged through the land to the depth of about four inches: after ploughing, they use a rough harrow. In the Tawaran they ploughed better, the earth being partially turned over to the depth of about six inches. The Idaan have divided the land into square fields, with narrow banks between them; each division is as much private property as English land, and is considered very valuable; the banks keep in the water: their crops are said to be very plentiful. Simple as this agriculture is, it is superior to anything that exists south of Brunei, and it would be curious to investigate the causes that have rendered this small portion of Borneo, between the capital and Maludu Bay, so superior in agriculture to the rest: I think it is obviously a remnant of Chinese civilization. Pepper is not grown north of Gaya Bay, and is confined to the districts between it and the capital. The Idaan use a species of sledge drawn by buffaloes to take their heavy goods to market. The gardens in the Tawaran are neatly kept and neatly fenced in. On the hills the plough is not used, and there the agriculture presents nothing remarkable beyond the great care in keeping the crop free from weeds; the tobacco is well attended to, and these districts supply the whole coast, none being imported from abroad. When carefully cured, the flavour is considered as good, and the cultivation could be easily extended.

Of the cotton I can say little, as I did not find that any of these tribes cultivated it, though they assured me that they purchased their supplies from villages nearer the lake. The Tuhan and Inserban districts produced it, they said, in considerable quantities; and I observed the women in several places spinning yarn from the cotton. The Bajus of Tampasuk obtain their supplies from a tribe near Maludu Bay.

Among the hills, the implements of agriculture consist of simply a parang or chopper, and a biliong or native axe; the ground is therefore no more turned up than what can be effected by a pointed

stick; in fact, the steepness of the valley sides is against an improved agriculture: it is better adapted for coffee. Mr. Low, who has much experience, pronounces the soil—a rich orange loam—to be superior to that of Ceylon; and Kina Balu being but twenty-five miles from the port, there are great advantages here: the plains are alluvial, and very fertile.

With regard to the amount of population, all estimates would be mere guess-work; but the population must be considerable, as little old jungle remains, except on the summits of lofty hills, the rest being either under cultivation or lying fallow, with brushwood upon it. The tribes on the Tampasuk estimated their own numbers at 5000 fighting-men; the Tawaran tribes are equally numerous; but, reducing that estimate, and putting together the various information received, I should be disposed to place the entire population of these districts at 40,000 people: this is, perhaps, rather under than over the amount.

The 5000 fighting-men that are stated by the Idaan to live on the Tampasuk are, they say, thus divided:—

The Piasau Idaan, 500; Ginambur, 1000; Bungol, 1000; Koung, 500; Kiau, 2000. Total 5000 men.

It is impossible to verify this statement, but we may test it slightly by the observations made. The Piasau Idaan, so named from the extensive groves of cocoanut-trees that surround their villages (*piasau*, a cocoanut), are spread over the Tampasuk plain, and I think I am understating when I say we noticed above fifteen villages: I should have placed their numbers much higher than 500. The Ginambur was a large village, and there was another of the same Idaan about a mile off, among the hills, which I passed through. Bungol is also stated at 1000 men: our Malays, who visited it, said that it was very large, while the extensive villages of Sambatuan, of Pengantaran, of Batong, with numerous others on the hills and on the left-hand branch, have to be included in the Ginambur and Bungol tribes. Koung is placed at 500, which is not a high estimate, there being above 300 families in the village. Kiau is stated to contain 2000 fighting-men: in this number are included the village of Penokok (small); of Labang-Labang (large); of Sayap, which we did not see. I should be inclined to reduce the Kiaus by 500 men, though we understood them to say that their tribe was numerous beyond the north-west spur, in the neighbourhood of Sayap.

I think we shall not be over-estimating the population by placing it at 4000 fighting-men, or 16,000 inhabitants. Rejecting the women and the children, both male and female, one in four may be taken as the combatants. There are many villages on the eastern branch, and populous, as the clearings showed. I may make

this observation, the result of many years' experience, that I have seldom found the statements of the natives with regard to population above the truth. In Sarawak and the neighbouring countries, where we had better means of ascertaining the correctness of the accounts rendered, we have always found it necessary to add a third to the numbers stated.

The Tawaran contains a population equal, or but little inferior, to that of the Tampasuk. The villages between the mouth and Bawang are numerous, but much concealed by groves of fruit-trees. Tamparuli was an extensive village, and Bawang of fair size. The Nilu tribe was scattered over the sides of the hills. Kalawat was a village of perhaps 80 families; Bungol contains about 150 families; the Tagow, Bangan, and other villages were observed on sub-spurs; and beyond Bungol the tribes must be numerous, if we may judge from the extensive fires made by them to clear their plantations. On the right-hand branch are also many villages; but we had no opportunity of examining them. Of the western branch I know nothing personally. By native accounts, the Tawaran is more populous than the Tampasuk.

Of Ananam I know nothing; of Kabatuan I saw little, beyond the Malay town; but I was informed that the Idaan were numerous in the interior of this river, as well as on the hills that surround Mengkabong. I have placed them at 500 men, or 2000, which is not a high estimate. Mengkabong contains also an extensive Baju population; and in estimating them at 6000, it is, I believe, much below the number: the villages are numerous, and the chief town large. It is possible that there are not more than 1000 fighting-men; but the Bajus are holders of slaves, and there are also many strangers settled among them.

Sulaman is placed at 1000, which includes both Baju and Idaan, and may be a little over the mark: for it I have nothing but vague native testimony.

Abai contains about thirty houses, perhaps not above 200 people; while in the hills are a few small villages of Idaan. I have put them at 125 men, or 500 in all.

Tampasuk contains about 150 Lanuns, or 750 population; Bajus, perhaps, 500, or 2500 people—they say, 600 men. I have multiplied the Lanun and Baju fighting-men by five, as they have many slaves, both male and female.

Gaya Bay contains about 300 people. The population of these districts may, therefore, be entered as follows:—

Gaya Bay, 300 Malays and others; Kabatuan, 1000 Idaan; Mengkabong, 6000 Bajus and others, and 1000 Idaan; Tawaran, 16,000 Idaan; Sulaman, 1000 Idaan and Bajus; Abai, 200 Bajus, and 500 Idaan; Tampasuk, 2500 Bajus, 750 Lanuns, and 16,000 Idaan. Total 45,250.

The only figures in the above which I think may possibly be

overstated are the Bajus of Tampasuk. Allowing for that, we may fairly reckon the population of the districts between Gaya Bay and Tampasuk at 40,000: being quite aware, at the same time, that this estimate is founded on very loose data; but it may serve as a guide to future inquirers.

There are but trifling manufactures carried on. The Bajus are much occupied in preparing salt for the inland tribes. This article is manufactured by burning the wood of the Nipa palm: the residue is then thrown into water, when the ashes are separated from the saline matter; the water is then boiled, and a coarse bitter salt is the result. It is not disagreeable, after a little use; and I prefer it to the coarse salt of Siam, in the state that the latter is usually sold. Very little salt is imported even at the capital, except for the purpose of curing fish.

The only other manufacture that is worth noticing is that of cloth from native cotton. The most esteemed cloths are those of the Lanuns. The cloth is generally black, with a few white lines running through it, forming a sort of check: it is strong, more durable than any other I have seen, and fetches a high price, varying from 5 to 10 dols. for a piece sufficient for a single dress. They are, however, deteriorating, since the introduction of cheap English yarn, which is superseding the carefully-spun native. No minerals have, as yet, been discovered in these districts beyond the coal in Gaya Island, though tin has been found to the north of Kina Balu, near one of the streams flowing into Maludu Bay.

There is but little trade carried on; the only articles of export are tobacco, rice, a little wax, cattle and horses, or rather ponies. The imports consist of cloths, iron, cheap earthenware, gongs, and occasionally a valuable jar. These jars, of ancient workmanship, fetch high prices, varying from 5*l.* to 500*l.* Little beyond tobacco is brought from the interior, as everything is carried on men's shoulders, none of their paths being as yet suited for loaded beasts. When Mr. Low visited Kiau, in 1851, beads and brass-wire were eagerly received; and though they took his cloth, it was not much prized. In April, 1858, we were advised to take wire and cloth; beads were quite at a discount. Having obtained the cloths at easy rates, their services being paid for in it, they in the following July cared for little else, all being eager to obtain trowsers, previously a bark chawat being their only cover. The Bajus ask such high prices for all cloths, that it places them almost beyond the reach of the aborigines.

A little trait of the women shows them an improvable people. I have noticed how dirty they were. On the last occasion we stayed fifteen days in their houses, and they were very attentive to

all our movements; they observed us bathing every day, and using our brushes and combs. We had brought some looking-glasses, and we promised one to a young girl, if she would go and wash her face: having done so, she received her present. The looking-glass showed them what dirty faces they had, and its effect was soon apparent: all the girls began washing, and those who were not fortunate enough to have one given them were eager to exchange looking-glasses for fowls. They begged us, when we came again, to bring them cloth, looking-glasses, combs, and needles.

It is a great drawback to this country having no navigable rivers; nor on the hills have they good paths. The latter are easily made, the country presenting no natural difficulties; while on the plains, very fair paths already exist, fit for sledges. The tribes in the interior are at present far beyond any commerce; in fact, the people near the lake have never been visited by the coast population, and trust to exchanging with the other *Idaan*.

With respect to the language spoken, I will at present make but few remarks: the languages of the *Lanun* and *Baju* are entirely different from the *Idaan*. I have made several vocabularies and many inquiries at *Kiau*; we collected there about 500 words; at *Blimbing* on the *Limbang* 300 *Bisay*; and whilst in *Maludu Bay* seven years ago, I made a short list. These three agree so far, that I may say that the *Idaan* and *Bisaya* have two out of three words in common; and, on further inquiry, I think that the remaining one-third will gradually dwindle away, as at present many words in my *Bisaya* vocabulary are Malay, for which they have their native words. The result of our inquiries is, that all the *Idaan* speak the same language, with differences. We found the tribes on the *Tampasuk* and *Tawaran* spoke fluently to each other; and one of our interpreters, who had never before visited these countries, but had been accustomed to the aborigines to the southward of *Gaya*, conversed freely with them. The *Bisaya* live on the rivers in the neighbourhood of the capital, and their language differs but little from the *Idaan*. I will reserve my notes on the aboriginal languages, and only add that the *Idaan* contains but few Malay words: these generally refer to imported articles and domestic animals; some are similar to those of the land *Dyaks* of *Sarawak*.

I will add a few remarks on the geology of these districts, premising them, however, with the observation that I am quite ignorant of the science. Wherever the rocks protruded through the hills, we noticed they were decomposing sandstone; and this character continued until we reached the great mountain. Occasionally, as in *Gaya Island*, the rocks were of a harder texture, and here a

Mr. Motley is said to have discovered a vein of coal. In the districts to the west and south of Tampasuk we noticed no signs of primitive rocks, while in the Tampasuk River huge boulders of granite are met with a little above Batang, while the *débris* extends as far as the junction; but the rocks of the hills are sandstone, and this character continues to the base of the mountain. At Koung the rocks dipped to the south-west by south at an angle of 45° . On the Marei Parei spur we could trace the sandstone to the height of about 4000 feet, the dip about 80° to the south-west; greenstone immediately after protruded, and appeared to form the chief rock. On the Marei Parei spur the compass was so affected by the peroxide of iron which formed a sort of coating to the rocks, that it would not act. The main spur consists at first of sandstone, then of black shale, almost as hard as rock; of various rocks I do not recognize; then of decomposing granite, above which commences the massive outline of the summit. I have preserved specimens of the rocks in the order found, so that a geologist may be able to affix their names; the only one to which I have not affixed a number, is a piece of limestone that was broken off somewhere near the base of the mountain in the Kalupis valley.

The country presents the appearance of having been originally of sedimentary rocks, through which the granite has found its way, upheaving the sandstone to an angle of 80° .

With regard to the climate I make a few notes. The plain and low hills are much the same as the rest of Borneo, or other tropical countries; but in the neighbourhood of Kina Balu it is of course different. We found at the village of Kiau that the thermometer never marked above 77° during the day in a house about 3000 feet above the sea, and varied from 66° to 69° during the various nights: the mean of the observations gave a shade below 68° . The Marei Parei spur offers a fine position for a sanitarium at about 5000 feet; our tent was pitched at about 4700 feet, and we found that the thermometer marked 76° (mean) mid-day, 60° at 6 A.M., and 56° (mean) at 6 P.M. This would be a delightful climate in a well-built house. The cave at 9000 feet was very cold,—at 2 P.M., 52° (mean); and during the three nights I slept there in May, it was $40^{\circ} 33'$ (mean), ranging between $36^{\circ} 5'$ and 43° . During the last trip in July, in the cave, the thermometer marked, at 6:30 A.M., 43° ; 9:15 A.M., 48° ; 3:30 P.M., 51.250° ; 6 P.M., 45.750° ; registering thermometer, 41.125° (mean) at night. On the summit at 1 P.M., exposed to mist and rain, it marked 52° ; while, exposed to a strong wind, and a storm of sleet and hail, it fell to 43° at 2 P.M. On a fine day it marked 62° at 12 mid-day in the shade, there being much refraction from the rocks.

I must add a few remarks on the rough map that accompanies

this paper. The coast-line is taken from the Admiralty chart, while the interior I have filled up from our observations and rough plans made on the spot. It may afford some idea of the country, and serve until some one, with greater advantages, makes a better.

Brunei, November, 1858.

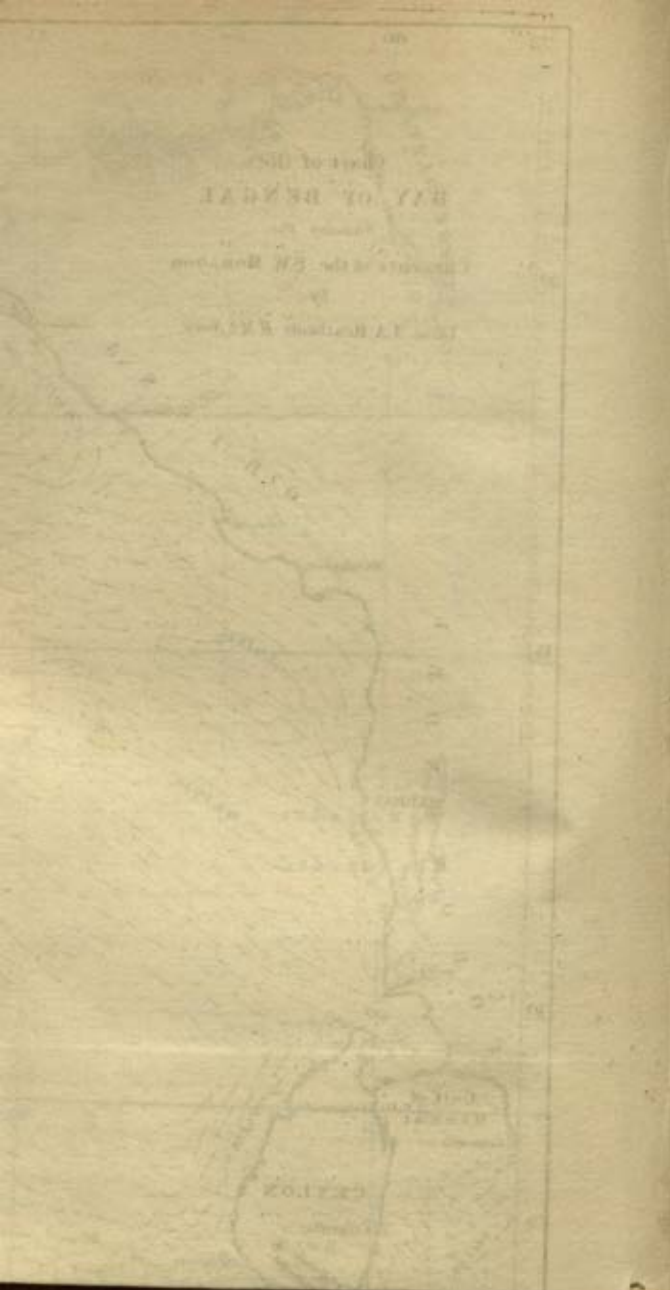
XVI.—*Surface Currents of the Bay of Bengal during the South-West Monsoon.* By J. A. HEATHCOTE, Esq., I.N.

Read, April 28, 1862.

THE subject of ocean currents is one in which the Royal Geographical Society has always taken a deep interest, both on account of its intimate connection with the science to which this Society particularly devotes itself, and also from its immediate practical utility. Much benefit has already accrued to navigation and commerce from the study of the circulation of the surface currents of the ocean; yet much remains to be done in the same direction, and with a promise of equally beneficial results.

The section of this subject to which I have particularly applied myself is the Bay of Bengal. Surrounded as that Bay is by the centres of trade of the various provinces on its shores—Akyab, Rangoon, Moulmein, and Penang on the east; the naval station of Trincomalee, Madras and several smaller ports in the same Presidency, and Calcutta on the west; all these places having constant intercommunication between themselves, and also with the countries of Europe, with China, and with America—the importance of this sea as a great highway of commercial traffic particularly recommends it to attention, while my own connection with it on surveying duties gave me a special interest in it, and moreover it gave opportunities of ascertaining facts, collecting information, and observing effects which have been of material assistance in prosecuting the subject of this paper.

The Bay of Bengal has not hitherto had that particular attention paid to it which must be necessary before any true determination of existing ocean currents can be arrived at. Horsburgh has given a short general account of these currents, but he omits details,—indeed he had not the opportunity of ascertaining them. He gave valuable information and the best that could be obtained at the time he wrote, but some of his statements are merely deductions by analogy, and it is not to be wondered at that experience has proved him to be sometimes, though not often, in error. Horsburgh having been the only available authority, he has been made use of wherever physical geographers of this or other countries, in elucidating the general set of the main currents



13-184
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of the ocean, have been obliged to include some representation of the Bay of Bengal; but I believe I am right in stating that this sea itself has not received their particular attention, and this may perhaps be accounted for by the fact that it was believed that it did not play any important part in the system of the great oceanic currents, and at the same time it did not present the attraction of an inland sea in which currents did undoubtedly exist, such as the Mediterranean and the Red Sea, where the opportunity might arise of propounding an interesting theory of the circulation of its waters.

A set of current charts for the Indian and China Seas for every month of the year, by Lieut. Fergusson, L.N., has been published; but they are on a small scale, and contain a mere sketch of the subject, and they are moreover, as far as the Bay of Bengal is concerned, frequently in error.

It may be well, before I describe the currents themselves, which I have ascertained from an accumulation of well authenticated facts, to show in what manner the chart of these currents has been constructed, and whence the materials were drawn, that the Society may be able to judge of the degree of credibility that may be attached to the result. The materials have been gathered from the Log-Books of the old East India Company's trading vessels, and those of H.M. ships which have been employed in the Indian Seas. The Log-Books of the old Indiamen, that is the Indiamen of thirty years ago, have been chosen in preference to those of other merchant vessels of the present day, because, by the kind permission of the Secretary of State for India, I was able to obtain them in any number at the Indian Office, and because I believe that, for the most part, more attention was at that time paid to those particular details of navigation upon which a knowledge of existing currents depends, than is generally to be found at the present day, when facilities for making use of celestial observations have so much increased as to render what is technically called "dead reckoning" the less absolutely necessary, and consequently the less particularly attended to. In the Indiaman I found a vessel with every means for good and reliable astronomical observations, but at the same time under the necessity and in the practice of paying a close attention to the computation of the ship's position from a carefully estimated course and distance run. This therefore presented the best material for my object. But, in order to make use of data of the present time as well as those of an earlier period, I have taken care to extract from the Log-Books of H.M. ships which have been employed in the Bay of Bengal of late years the result of their experience in the currents of that sea.

Permission and facilities for doing this were courteously afforded me by the Secretary of the Admiralty and Admiral Washington,

and by these means I have been able to avail myself of the experience of a great number of navigators of the first ability during the last forty years. Steam vessels have been avoided—for their passages are not well adapted to show the influence of the currents they may encounter. In a long run of 200 and 250 miles a day, they may have passed through or been influenced by more than one current of different direction and force; and yet the result of their reckoning will show only the combined effect of these different currents, and can be no guide to the separate influence of each.

The difference between the position of a ship as computed by dead reckoning, and that ascertained by astronomical observations, is generally put down to the influence of currents; and this makes up the chief material of which current charts are mostly composed; but it can only be accepted after very strict scrutiny and with many reservations. Numerous elements of error have to be avoided as far as possible. Inattention to the variation or the local deviation of the compass in use will considerably affect a ship's reckoning, and its results may be erroneously set down to the influence of currents,—bad steering or neglect of a proper computation of leeway may likewise have their effects attributed to currents,—but a careful examination of the Log Book will lead to the detection of many of these errors, and will point out in a great measure what may be received as a reliable indication of a current, and what should be rejected as untrustworthy. This will always be a great safeguard, and to it may be added, after such selection, that of the acceptance of the experience of the many, in preference to the exceptional evidence of one or two isolated instances, however well founded. For this purpose the testimony of as many cases as possible has been brought to bear on all the principal points. The number of logs made use of in this computation is one hundred and five.

My investigations have been limited at present to the currents of the south-west monsoon. It is at this season that the greatest dangers are presented to navigation, and that the currents are the strongest for weal or woe, and it is of these only that I propose to treat.

Ceylon.—From the south-west corner of the peninsula of India, the current of the south-west monsoon runs in a direction varying from south-east to south-south-east, according to the distance from the land, and at the rate of $\frac{1}{2}$ to $1\frac{1}{2}$ mile per hour until, about the latitude of Point de Galle, it is diverted into a more easterly course. On the line between Cape Comorin and Point de Galle there is a strong set into the Gulf of Manaar, which begins from 30 to 35 miles outside this line, and may prove a source of danger. Vessels from Bombay to the eastward should therefore be careful

to keep within the limits of the favourable south-easterly current. South of Ceylon, within 30 miles of the coast, the current runs strongly to the eastward from $\frac{3}{4}$ to 2 miles an hour; but farther south, that is, between the parallels of 4° and 5° , its direction is more southerly, or about E.S.E.

On the east coast of Ceylon a strong current exists to S.S.E. and S., taking more or less the direction of the land, and running at the rate of $\frac{1}{2}$ to $1\frac{1}{2}$ mile an hour, or as much as 40 miles a day.

The inaccuracy of a deduction of Horsburgh is here apparent. He states the current at this season to be here running in an entirely opposite direction, that is to the northward; for he argues that as it runs to the southward in the north-east monsoon, it may most probably run in a contrary direction in the opposite monsoon. Such, however, is not the case. This southerly current is well established: not only are numerous instances of its effects on record, as those of the *London* in July, 1830, the *Warren Hastings* in June, 1833, the *Kellie Castle* in May and June, 1833, and H.M.S. *Cambrian* in July, 1850, amongst many others, but the result of my own investigations has also been confirmed by the observations of officers very recently employed on the survey of the east coast of Ceylon. This current is felt not farther than from 40 to 50 miles off shore, and from its eastern limits a north-easterly set begins. I think it very possible that future observations may prove that this current is a return of that which flows with great velocity round the south-east corner of Ceylon to the north-eastward, a portion of which may be found to bend to the northward; for under circumstances somewhat analogous a return current of this description is found off Cape Guardafui in Africa. At the Basses Rocks it is met by that already described as setting eastward off the south coast of the island; and they both together then take a north-easterly and afterwards an east-north-easterly direction across the bay; except that, in the vicinity of the parallel of 5° north, the set is less northerly, while south of that parallel it becomes east-south-easterly.

Coromandel.—On the coast of Coromandel a northerly set prevails within 30 miles of the shore as far north as the parallel of 15° : outside these limits it turns to the north-eastward. North of the parallel of 15° it takes the direction of the land as far as Gordewarè Point, and thence trends in an easterly and afterwards a north-easterly direction across the bay. From False Point nearly to Vizagapatam we have a strong south-easterly current of $\frac{3}{4}$ to $1\frac{1}{2}$ mile per hour within 30 miles of the coast; but farther to the eastward it gradually succumbs to the influence of the wind, and joins the general set, first in a north-easterly and then in an easterly direction across the bay.

Arakan.—On approaching the coast of Arakan, the last-

mentioned current becomes more northerly, and finally is governed by the form of that land, and runs strongly to the north-north-westward. It thus becomes a very dangerous current for vessels making Akyab during the south-west monsoon. In such cases it is frequently necessary to heave-to off the port during the night; and if the existence of this current be not known, and proper precaution be not taken to keep to the southward, the vessel may be drifted into dangerous proximity to the reefs to the eastward of the harbour. In some of the works on this subject, all mention of this current is omitted; in others it is represented as running in a contrary direction: it is therefore the more necessary to call attention to it, as either the want of information on the one hand, or the existence of erroneous information on the other, may lead to injury to the greatly increasing trade of Akyab.

Circulation of Currents and Tidal Waves.—This northerly current along the coast of Arakan may probably have a very intimate connection with the southerly current on the coast of Ganjam. They may both belong to the same system of circulation, the Arakan current finding its way to the westward along the sea face of the Sunderbunds and becoming the southerly current at False Point, and being again thrown on the coast of Arakan as before described. But if this be the case, any positive trace of the westerly movement is not to be discerned, or at least is most difficult to recognize in the peculiar rotatory tides which are found to seaward of the Sunderbunds. These tides set, at different periods of each tide, towards every point of the compass. The flood begins at west, at the first quarter it flows west-north-west, at half flood it is about north, the last quarter being to east-north-east. The ebb begins at east, half ebb runs about south, and the last quarter ebb west-south-west, thus forming a complete rotation. But although these rotatory tides go far to hide the current itself, its effects while working its way to the westward are observable in the configuration of the sand-banks off the mouths of the Ganges. The current would here exert its greatest force, and these sands are curved to the westward in a remarkable manner—their very form proving that they are under an influence stronger than that which bends the banks off the mouth of the Hooghly into their south-south-easterly position; the latter being due to the south-west monsoon itself, while the former is the effect of the current of the same monsoon concentrated as it were in a funnel by the shores of Arakan. That the position of the banks off the mouth of the Ganges is *not* caused by the north-east monsoon admits of but little doubt; for this portion of the sea is peculiarly sheltered from the north-east winds, and they cannot be supposed to exert a force sufficient to affect the position of these sand-banks: were it so, the effects of this same force would be apparent in a much

greater degree to the westward; and the sands at the entrance to the Hooghly would lie in a south-westerly direction instead of their present south-easterly one.

South-easterly Current.—A strong current to the south-eastward at the rate of $\frac{3}{4}$ to $1\frac{1}{4}$ mile per hour begins about lat. 18° and long. 90° , flows down towards Preparis Island, and then turns more easterly into the Gulf of Martaban. There is, no doubt, an accumulation of waters in the north-east portion of the bay, caused by the steady blowing of the south-west monsoon across the whole breadth of the sea; and this current seems to be the result of these waters attempting to find an exit. It may be of important advantage to ships from Calcutta bound to ports to the eastward, for it will materially help them in getting to the southward against the wind. From its eastern edge the currents turn off to the north-eastward until, near the coast of Pegu, they become governed by the form of the land, and take a course to the north-north-westward, joining those on the coast of Arakan already described.

Andaman Islands.—The Andaman Islands, which have lately formed the subject of an interesting paper read before this Society, play an important part in the system of currents of the south-west monsoon. They present an obstruction to the general set of the waters in the middle of the sea, and the same phenomena are observable in their vicinity as are to be seen wherever fluids in motion meet with an impediment under similar conditions. The currents rushing to the eastward round the north and south extremes of the islands meet at a short distance beyond them, become confused and irregular, and throw up high rippings, while immediately under the shelter of the islands an eddy is found running to the northward from $\frac{1}{2}$ to 1 mile per hour. That portion of the sea to the westward of the Andaman Islands is wisely avoided during the south-west monsoon, the reefs lying to windward of the islands presenting dangers to which every prudent mariner would gladly give a wide berth; and I have therefore been unable to find examples of actual experience of the currents to the west of the Andamans; but it is more than probable that the north-easterly set extends close up to the islands, the waters becoming, in a certain measure, heaped up on their west side, and making their way through them and round them wherever they find an opening. Evidence of this action is particularly observable at the eastern mouth of the narrow strait which separates the south and middle Andaman. This strait was closely examined on the occasion of the expedition of which Dr. Mouat was the head, appointed, towards the close of the Indian mutinies, to select a site for a penal settlement in these islands. I may remark, *en passant*, that the manuscript of the original survey of the Great

Andaman by St. Blair, executed at different periods between 1788 and 1796, and drawn on a large scale, was in the hands of the expedition, and was found to be beautifully accurate in all its details. It was our sure guide in the intricacies of channels, of which no other knowledge but that afforded by this chart was to be obtained; and in those few places where it is deficient in the representation of details, we found that they had not been passed over until it had been ascertained that they could be of no practical utility. The geographical position of these islands has also been determined so far satisfactorily, that though it may not be incapable of a still nearer approach to exact truth, yet it has, I believe, attained already to a higher degree of accuracy than can be claimed for the positions at present assigned to many places of far higher commercial importance.

Middle Strait, Great Andaman.—The Strait between the Middle and South Andaman is one of peculiar formation; it is for the most part a narrow, deep crevice between the mountains by which it is bounded on both sides, and which are in no part distant from it much more than 300 yards, while at places the rocks completely overhang it. The channel is thus narrowed at one or two points to about 80 yards, its general breadth being from 400 to 500 yards. Its depth varies, but it is mostly deepest where it is narrowest, 25 fathoms being found where the rocks abut immediately upon the channel, and 6 fathoms where they are more distant; a depth of from 12 to 14 fathoms is, however, very generally found throughout the narrow part of the strait, its western portion, where it runs north and south, being both broader and shallower. Its western entrance from the sea has now a depth of from 4 to 6 fathoms, it having been filled up to some extent during the last seventy years, while the interior of the strait has suffered scarcely any perceptible change. We found no variation in the depth, nor in the contour of the shore; even small islets of less than 50 yards in length appearing in precisely the same state, as to size, elevation, and position, as represented by the first surveyor. But while the depths before mentioned are found in the strait itself, its eastern mouth is almost closed by a bank of sand and mud which has but from 6 to 10 feet water on it; and this I believe may be looked upon as the effect of the current of the south-west monsoon, which being driven, as before described, upon the west coast of the island, finds its way through this narrow strait and deposits at its exit the sediment which it had taken up or set in motion on its passage. The area of drainage of this strait, though small, is sufficient to throw into it a considerable quantity of silt and sand, and the very form of this bank indicates that it has come out *from* the strait, and not that it has been thrown *into* the strait by any effort of the winds and currents of

the north-east monsoon: and moreover were this latter the case some corresponding effects would surely be observable at some of the other openings on the same side of the island, such as Port Cornwallis, the entrances north and south of Sound Island, and Port Blair, at all which places instead of shoals we find deep water. The strait between North and Middle Andaman is completely closed; it is now no longer a strait, if it ever was one: and this is not at all certain; for Blair had not the opportunity of surveying it,—he probably found it impossible to enter even in a boat, as we did.

In the open sea between the Mergui Archipelago and the Andamans, the influence of the prevailing wind again shows itself in a north-easterly set of $\frac{1}{2}$ to $1\frac{1}{2}$ mile per hour.

A south-easterly and south-south-easterly current sets with considerable force down through the Mergui Archipelago and past the Seyer Islands; and from lat. 10° N. and long. 95° E. a strong current in the same direction sets at the rate of $\frac{3}{4}$ to $1\frac{3}{4}$ mile per hour into the entrance of the Malacca Strait. This current may probably be found some degrees farther to the eastward, but I have been unable to gather any facts in support of such a theory, though I know of nothing in opposition to it.

The Ten-Degree Channel, between the Little Andaman and Car-Nicobar Island, is so seldom made use of as a passage for ships during the south-west monsoon, that I have not been able to gather a sufficient number of facts to establish the existing current.

Sumatra.—On the north coast of Sumatra the current of the south-west monsoon follows the form of the land to the westward, but this portion of the sea is sheltered from the influence of the wind. A slight return current to the eastward may be experienced in about lat. $6\frac{1}{2}^{\circ}$ N.

Between Acheen Head and the Great Nicobar an extraordinary current is found running to the south-westward in the teeth of the monsoon at the rate of $\frac{3}{4}$ to $1\frac{1}{2}$ mile per hour; it extends to the parallel of 5° N., and nearly to the 92nd meridian, when it turns to the south and south-east. Where this current meets the ordinary north-easterly set, strong rippings are observed. It may be taken advantage of by ships bound westward from the Straits of Malacca; and though it is at present but little known, its existence is well substantiated by the experiences of the *Herefordshire* in August, 1825, the *Orwell* in July, 1832, the *Marquis Huntley* in August, 1831, H.M.S. *The Royalist* in June, 1845, the *Cambrian* in July and August, 1844, the *Serpent* in 1845 and again 1851, and others.

XVII.—*Remarks on the Mosquito Territory, its Climate, People, Productions, &c., &c., with a Map.* By CHAS. N. BELL, Esq.

Communicated by JOHN ARROWSMITH, Esq., F.R.G.S.

DURING a residence of about sixteen years in the Mosquito territory, I had occasion to travel over the greatest part of it; and I employed all the time I could spare in surveying the courses of the rivers I had ascended, and gathering such information of those I had not, as enabled me to lay them down in this map. The rivers, lagoons, creeks, and innumerable inland water-passages will be found very accurate; and are the more valuable because they are quite imaginary as laid down on all the maps I have yet seen. The boundary of the Mosquito kingdom extended originally from Roman River to a place called "King Buppan" (in the Mosquito language, King's Anchorage), which is a small cove 20 or 30 miles south-west of the southern entrance of Chiriqui Lagoon. But the kingdom was reduced to its present dimensions by order of the British Government in the year 1842, as far as I recollect. It is now bounded by the sea from Roman River to Greytown, along the north bank of the St. John's to the branch of it called the Sarapiqui, and from thence in a straight line to Roman River mouth, but this part has never, I think, been clearly defined. It presents great variety of feature, but does not equal in grandeur of scenery the Spanish-American states W. and S. of it. From Greytown to Blewfields high mountain-ranges in a north-west and a south-east direction approach the water's edge, forming bold rocky headlands and deep bays; and the rivers in this district are very short, and very shallow and rapid. The mountains, as far as can be seen from their spurs near the sea, are composed of trap and quartz; the former being exposed to the air soon gets a coating of soft yellow-ochery earth, which falling away in scales becomes a deep and fertile soil: consequently this part of the country, up to the top of the mountains, is covered with a dense and magnificent forest; except some of the highest, which seen from the sea appear to have a cap of scrubby bushes and grass. The scenery along this part of the coast is very fine, especially on a stormy day, when the wild surf dashes in white columns up the dark basaltic cliffs, falling back in wreaths of spray, and the heavy clouds roll over the hill-tops and up the deep and narrow gorges in grand confusion. This part has never been traversed by white men, and is uninhabited except by the scanty remnant of a tribe called Ramas, in number not exceeding 200. After passing Blewfields northward, a few ridges and mounds of trap and limestone mark the retiring mountains; the country becomes quite flat and alluvial near the sea; extensive savannahs here prevail, intersected, where river or water courses traverse them, by broad

Map of the MOSQUITO TERRITORY.

From Surveys and Sketches
made during several years residence in the Country
by
Chas. N. Bell, Esq.

1856

Scale of English Miles



however small
of which I
have the record
I find that

Vol. 1

Vol. 2

Vol. 3

Vol. 4

Vol. 5

Vol. 6

Vol. 7

Vol. 8

Vol. 9

belts of forest. Though of little use for the purposes of cultivation, these savannahs are by no means dreary wastes: they present all the appearance of a beautiful English park; the ground here level, there rolling and undulating in gentle hills, clothed in long but coarse wiry grass, and ornamented with clumps of the pretty "papa" or fan-palm, and groves of dark and stately pitch-pines. Occasionally is found quite an European bit of scenery, where pines, live oaks, and willows, with banks of tall fern and moss, afford shelter to troops of deer and numbers of Indian rabbits that feed on the cones and acorns. As you go inland the savannahs become overgrown and gradually give place to the forest, and the land becomes higher as it recedes from the sea.

As far as Wawa River these savannahs are only in patches within 20 or 30 miles of the sea; but beyond that to Brewer's Lagoon the whole country is savannah for 50 or 60 miles inland. From Brewer's Lagoon to Roman River there is a pretty equal distribution of forest and open land. These tracts are excellent pasturage, and the Indians raise a considerable number of fine cattle and horses on them; deer, tigers, and quails abound, and afford good sport. In the early dawn or the cool of the evening the deer come out of the patches of forest in great numbers, and the Indians kill them with guns or arrows, by concealing themselves behind the clumps of fan-palms, and keeping to leeward of them. All the savannahs that I have examined I found to consist of a subsoil of tough yellow or red clay, filled with pebbles of pure white quartz (in some places whole beds of them); over this is a stratum of 18 inches or 2 feet of a black peaty soil filled with roots of plants: this supports the grass and fan-palms, but the pitch-pine, oak, &c., send their roots far into the clay. In some places the subsoil is pure white pipeclay, with streaks of red; it is many feet in thickness, and below is generally a bed of gravel.

In consequence of this geological character, these savannahs are generally very wet; and in the rainy season every hollow becomes waist-deep in water, which takes a long time to drain off. There is a large tract of country in the neighbourhood of Cape Gracias à Dios, which is constantly wet and boggy; yet the most magnificent cattle are reared there, as fat as if they were stall-fed: they feed all day up to their knees in water, and at night resort to the knolls on which the Indians live, to sleep. This continual soaking of the feet occasions the hoofs to rot off great numbers of them, which have then to be killed.

The coast from Pearl Key Lagoon to the Cape, and from thence to Brewer's Lagoon, is a long low stretch of sandy beach, with the tall white mangrove-trees behind. From the sea it presents only the dreary aspect of an endless stretch of white surf, with an even line of green behind, without a knoll or headland to mark the

whereabouts; and the Indians only distinguish places by certain odd-shaped trees, or patches of tall cabbage-palms which grow at the rivers' mouths. In several places, however, there are very extensive and valuable cocoanut-groves, which line the back of the beach for many miles, and yield cargoes of excellent nuts. Beyond Brewer's Lagoon the mountains again approach the sea; and in the neighbourhood of Black River, Cape Cameron, and, Roman, the land from the offing looks quite Alpine, the mountains rising to the height of 4000 feet. The ranges avoid the shore till they reach Truxillo and Omoa, in Honduras, when they descend to the water's edge.

A distinguishing feature in the Mosquito coast is the number of lagoons and the innumerable inland channels that lead from one river's mouth and from one lagoon to another: these latter are mostly shallow, with deep channels through them. Pearl Key Lagoon, however, is deep enough to allow a vessel drawing 7 feet water to sail up it. It is surrounded by densely-wooded and very fertile land, and abounds in game. Three considerable rivers run into it, but they are not navigable very far up. Blewfields Lagoon is the most picturesque of them all, having hilly shores on the west side, and the mountains at the back of Monkey Point tower over the southern end; it is about 16 miles long and 5 broad, dotted over with numerous high and wooded islands, the resort of countless swarms of pigeons.

Into this lagoon run two large and two considerable rivers, besides numerous small streams; and the quantity of mud which they bring down in the rainy season would seem to be filling it up, as large tracts, that the old inhabitants remember were once shoal water, are now covered with dense mangrove wood, nor will the entrance admit the size of ships it used to do.

The lagoons in the north are nearly all shallow, with low swampy shores, densely wooded with mangrove and other swamp-growing trees. They are all fresh in the rainy season, and salt in the dry; and abound with various sorts of fish, according to the state of the water. There are also immense beds of fine oysters in almost all of them.

One cannot fail to be surprised at the great number of rivers that run into the sea along the Mosquito shore; yet, when the quantity of rain that falls is considered, they are not more than sufficient to carry it off. After crossing the bars at their mouths, many of them are navigable for ships a long way up, and all of them for canoes of any size: some afford a convenient passage into the neighbouring Spanish states. With few exceptions, the banks are low and swampy at the mouths, but at various distances from the sea they rise and become very high; rapids and falls abound, but are easily surmounted in the light river-canoes of the Indians. The

scenery up these rivers is quite unequalled of its kind : near the sea, as far as the salt water reaches, the banks are wooded with white, red, and black mangrove, sapodilla, Santa Maria, Saba, and a hundred other swamp-growing trees, with an underwood of small prickly-palms and bamboos. These grow close down to the water's edge, supporting innumerable flowering vines, which, covering the tops of the highest trees, fall in matted festoons into the water; making a perpendicular wall of foliage, covered with sweet-smelling flowers of every hue, presenting an unbroken face for miles, except where a great silk-cotton tree has fallen into the river, leaving a dark door into the thickets inside, or a cabbage or hone palm thrusts its feathery top through the wall as if to get a peep of the broad river. In other places the beautiful sillico or hone palm hang over the river for miles, making a delightful arcade under their graceful branches under which to paddle when the sun is scorching on the open river.

As we get out of the reach of the sea-water the land rises, and the vegetation assumes a new aspect; the banks are fringed with a broad band of "kboo" or scutch-grass, above which is a dense jungle of bamboos, and above all, the stately magnificent forest which the Indians call the real forest, in distinction from the tangled thickets of the lower parts of the river. Here the river winds through banks of sand and pebbles, the favourite resort of numbers of alligators, guanas, and river-tortoises, which bask in the sun in the heat of the day; here and there enormous silk-cotton trees crown the banks, growing among the grass a little apart from the forest; in other places the Indian fig bends over the water, sending hundreds of roots into it from its highest branches, and forming a luxurious shady retreat from the overpowering noonday heat. Higher up, the river is occasionally contracted between perpendicular rocks, overhung with beautiful "sungsung" bushes and bamboos; which in some small rivers, bending over from either side, meet overhead, totally shutting out the sun, and casting a dark and ominous shade over the boiling river below, which rushes through the broken rocks and round the sharp bends with a dangerous velocity. Farther on it opens out again into broad sunny reaches, the sides covered with bright green grass, among which the beautiful silver-barked mountain-guava rears its lofty head, often festooned round with the pendent nests of the yellow-tail, which choose this tree, as no snakes nor monkeys can climb its smooth stem. Some of the rivers, as the Toongla, Twaka, and Laya Siksa, run for miles through cliffs of red clay, which the floods are constantly wearing away, so that large pieces of the bank are precipitated into the stream, with all their bamboos and trees upon them, which wave about in the water, and make an extraordinary appearance. The forest, though pretty open in the upper parts of the river, has occa-

sional dense patches overgrown with a small very thorny species of bamboo, called by the Indians "Sookwa," interlaced with thorny vines and cutting or razor grass. In other places large tracts are covered with a long, pointed, very tall reed, with leaves like the bamboo; large trees grow scantily among them, but no other under-wood. In other places are found groves of cahka and other prickly-palms which strew the ground with prickly leaves and seeds, making it almost impassable for the barefooted Indians, which is the more provoking as these places are the resort of droves of "Warrel" and peccary (two species of wild hog), whose favourite food is the prickly nuts of these palms. Covered as the country is with wood, the only way to get a view of it is by climbing a tall tree growing on a hill: thence you see spread out under you a sea of tree-tops, undulating in small hills, with a few elevated ranges towards the westward, but falling towards the east in a level plain, which, from its uniform colour, can hardly be distinguished from the sea; the land is intersected by innumerable little streams and ravines, but the soil is deep and fertile. On the small streams running into the main rivers are situated almost all the mahogany-works, as the mahogany-tree seldom grows near enough to the main river to allow of its being conveyed direct into it. These streams, or creeks as they are called, present the most romantic and beautiful woodland scenery that can be imagined; winding through dark moss-covered rocks, through avenues of tall trunks, or under a leafy arch of bamboos and "sungsung" trees, and the noonday sun can only penetrate the thick foliage in small patches. In places the creek opens out and lets down a blaze of sunshine, the more delightful from the gloom of the rest; while the banks of white sand and pebbles dazzle the eye as you emerge from the shady recesses. Here flocks of curassows, with their legs stretched out and covered with their wings, recline luxuriously in the sun, and numbers of guanas and tortoises crawl up to warm their chill blood; occasionally an otter emerges from the clear deep pool with a prime fish, and laying it down gambols about on the sand; flocks of little green river-swallows skim over the surface of the water, uttering their shrill cry; and gorgeous humming-birds appear for an instant at the clusters of flowers that hang over the stream, then dart into the depths of the gloomy forest again. The stillness that reigns in the woods at midday is something awful; uninterrupted save by the tinkling of the millions of crickets or the mournful cooing of the ground-dove. All Nature seems to retire to rest for a season when the sun, having reached his highest point, sends down a flood of light and drowsy heat. On a stone in the middle of the murmuring stream the snowy white egret dozes on one leg, unmindful of the little fish that venture near; the gaudy kingfisher preens his feathers on a twig over the dark pool where he is shortly to

resume his labours; and even the restless monkeys congregate in little knots on a great spreading tree, some lazily reclined on the biggest branches, some picking one another's hair; every now and then some of the more active pursue one another over the branches, then return, and cast themselves down beside the rest, and doze away for a while, with their heads bent down between their knees.

But when the cooler rays of the declining sun begin to slant through the trees, the woods wake up again as it were from a trance. In all directions are heard the cries of different birds and animals; long strings of yellow-tails wend their way to some favourite fruit-tree, uttering their whining cry; flocks of green parroquets rush through the trees with deafening screams; and the quam startles one with his loud shriek as he flies down to the ground in search of seeds. But time and ability would fail, were I to attempt to describe the varied beauties of these tropical forests under the various aspects of the seasons.

The Mosquito shore enjoys a very equal, and, considering the latitude, a very cool temperature; the thermometer seldom rising above 82° , nor falling below 71° : which may be ascribed to the extent of country covered with forest and the proximity of the sea. But, though the temperature may be regular, the climate in other respects—the changes from wet to dry, and from calm to stormy—is very irregular, and in that respect differs greatly from most tropical countries.

January sets in with cold rainy weather and strong north winds, rising at times to heavy gales, and accompanied with thin drizzling rain. February and half of March are similar; but dry norths, with bright clear weather, prevail towards the month of March, and frequent squalls from the north-east. In March, strong north-east trade-winds blow, with heavy squalls and dry weather. April is often blowy, but with very fine dry weather. All the rivers and lagoons now become salt, and sea-fish come into them in shoals; and the sea, which during the rest of the year had been of a greenish-yellow colour, now assumes a deep sea-green, from the rivers being all clear and very low. At this time the Indians set fire to the savannahs; and if the wind happens to be north, the whole country is obscured with smoke, the sun becomes as red as in an eclipse, and the smell of the fire is perceived for hundreds of miles. This is also the breeding season for beasts, birds, and fishes; and the Indians reap a rich harvest of alligator, tortoise, and guana eggs from the great sandbanks along the rivers, which are now left dry.

In May, hot dry weather with light east and south-east breezes prevail, varied at times by calms, lasting many days. Towards the end of May, signs begin to appear of the approach of the rains. Every day towards the afternoon, the clouds which are brought

over from the sea are piled in a dark bank to the westward, out of which the faint rumbling of distant thunder is heard; this is the first thunder of the year, and the Indians say it is a sign for the eggs of alligators, &c., to hatch, and to recall those stars which had been absent, and which now begin to be seen early in the night. This gathering of clouds, or land-wind banks, as it is called, is occasioned by the land breeze, which begins to be prevalent now during the night. Several circumstances connected with the land-wind deserve to be remarked.

There is a tendency in the land-wind at all times to come off from the shore, night or day, whenever the land is sufficiently cooled to permit it to act. I have often noticed that when a heavy sea-breeze comes to a sudden termination, and there is a complete lull, the clouds and rain which generally accompany such a termination having sufficiently cooled the earth, the land-wind is presently perceived, by the perfume of flowers coming off. The lulls between the tremendous and frequent easterly squalls in July are often filled up by a faint land-wind stealing timidly out to sea, to be again rudely driven back by the next squall. When this concussion of divers temperatures takes place, it immediately precipitates all the suspended moisture in the air, and the course of the two winds is plainly marked by the showers which precede them. In the dry season—from the end of February to the middle of May—the trade-winds blow stronger and more regularly than during the rest of the year, which would seem to retard the land-wind, for during that time it seldom blows, and there is sea-breeze night and day; or it is, perhaps, owing to the want of rain, when the earth being dry all night does not become sufficiently cold to counteract the strong easterly winds. The land wind is always stronger in the neighbourhood of large pieces of fresh water, which, being supplied by streams flowing through the forest, are of low temperature. I have often been surprised at the furious land-wind blowing out of Pearl Key Lagoon, while on the coast to the northward, which I had just sailed past, it was hardly sufficient to put the boat in motion. On that part of the coast from Cape Gracias à Dios to Great River, the land-wind is lighter and less frequent than on the coast to the southward: the former being low, with extensive tracts of savannah, and the latter wooded and mountainous; and the land-winds come down from the high land with a strength equal to the strongest sea-breeze. On that part of the Mosquito Coast facing east, a north-east sea-breeze is generally followed by a north-west land-wind; an east sea-breeze by a west land-wind; and a south-east sea-breeze by a south-west land-wind; but it is a curious circumstance that the latter is seldom accompanied by any land-wind. It is remarkable how close the two winds approach each other. I have frequently drifted out of a river on a raft of

mahogany with the land-wind blowing, and on turning the reach that entered the sea, found that the sea-breeze was blowing, and had been all night, to our great annoyance, as we had to stop the raft (if possible), and get back into the river, on account of the breakers. Two canoes are often seen sailing a mile or two apart, each with an opposite wind. The sea-breeze often comes in with violent squalls, showers, and waterspouts, and then a fine steady breeze succeeds during the rest of the day. At this time also most plants and trees flower, and by them the Indians know the close approach of the rains.

June very often comes in fine, but soon shows its true colours: torrents of rain deluge the country, and tremendous thunder-storms rage for six or eight days at a time; then succeeds a short period of fine sunny weather, and the ground steams like a pot; the rain again descends with renewed fury, every little gully becomes a raging torrent, and pools of water, breast-high, stand in the dark and dripping forest; the rivers, full to their brim, rush along with irresistible force, bearing on their red surface great rafts of bamboos, trunks of trees, some with all their leaves upon them, islands of floating grass, piles of plantain and banana trees, and sometimes dead deer and warree; all the low lands near the sea are flooded over, and the Indians kill numbers of game, which congregate on the rising knolls yet uncovered; and in some settlements the houses are flooded, and the people have to remain in their canoes, and sleep on raised stages (under the eaves of the roof) till the flood subsides. The forest during these rains assumes the most dismal aspect. In the middle of the day it is nearly as dark as night, while the fitful flashes of lightning cast a sudden and unearthly glare around; the shady nooks overhung with palms and creeping plants, which on the sunny days are regarded with delight, become ponds of water, filled with croaking frogs. No varied tints and deep shadows adorn the view; the trees, bent down with the pouring rain, present only a vista of dark mist, unrelieved by any cheerful gleam; and to the songs of birds and cries of animals have succeeded the roar of the rain and the growl of the distant thunder, which makes everything shake as it reverberates through the woods; terrific squalls at times tear through the forest, wrenching off branches and uprooting the venerable patriarchs of vegetation. Towards the middle of August the weather begins to clear up, and there is generally fine weather till the end of October, with heavy squalls and showers at times, and much thunder. October always brings a period of ten or twelve days of south-west wind; this blows off the land several hundred miles to sea, and is always accompanied by bright cool weather. A great deal of south-west wind also blows in August and September, and being unaccompanied by the cooling land-wind, the

nights are disagreeably hot; during their continuance the weather is generally bright and sunny, and the thermometer sometimes rises above 90° .

In November heavy north-easters prevail, with dark rainy weather; varied now and then by strong gales from the north, accompanied by thin rain and chilly weather. These northers, as they are called, are most destructive to the mahogany vessels anchored off that part of the coast lying east and west, and they are frequently dragged ashore with four anchors down.

December is similar, but dry norths are more frequent; these blow exceedingly hard, with the most beautiful bright weather, and very cold. The sky becomes deep blue, and the stars shine out with unusual brilliancy, so much so that the Indians can foretell the coming of a dry north from the brightness of the stars. In November and December it rains very heavily for a short time, generally coming with the first north, and the rivers rise almost as high as in July. But these floods are not to be depended upon for driving mahogany or any operations connected with floods, as sometimes they do not take place at all in November; and sometimes in December the last thunder of the year is heard, after which it ceases till the end of April or middle of May. In spite of its rainy climate and immense forests, the Mosquito territory is one of the most healthy parts of Central America. No bad epidemic sickness has visited the country in the memory of the oldest people, except the cholera, which visited it in 1855, but soon passed away. Ague is less common than might be expected; and white people, who do not recklessly expose themselves, enjoy the best health.

The Mosquito territory is very thinly inhabited; the entire Indian population not being supposed to exceed 10,000 or 15,000, of which the Mosquito, or principal tribe, numbers nearly the half. This tribe inhabits the whole coast from Pearl Key Lagoon to Black River, and along the banks of the Wawa and Wanx, or Wanks Rivers for a great distance inland. They are a fine set of men, lively, intelligent, and high spirited; but they have learnt no good from the intercourse of English and American sailors, and some settlements are notorious for their rascality. They are a violent, quarrelsome set of Indians, and most terrible drinkers. From the king being of their tribe, and the remembrance of the deeds of former days, they have still a great propensity to plunder and illuse the surrounding tribes, in spite of all the king can do to prevent them. They are lazy, insolent, and have a most overweening idea of their own consequence and capabilities; yet these questionable propensities show an impulsive nature with some character, which only needs to be properly directed and ruled, and these characteristics make them much superior to the stolid and impassive tribes surrounding them. They are kind and hospi-

table to strangers, yet they are avaricious and grasping in their dealings with one another; and exact old debts with the greatest greediness, though two generations may have passed since the time the debt was incurred.

Their indolence and occasional extraordinary activity is also a matter of surprise; nothing will induce them to work steadily for any length of time, and they devote a great part of their days to sleeping in hammocks. Yet they will pursue the chase through tangled and thorny woods with the most untiring energy; they will scarcely clear the weeds from round their houses, but will make a tedious voyage of a hundred miles in a small canoe to sell a couple of turtle, worth two dollars. Nor is their childish fear of death in some shapes, and their fearless defiance of it in others, less paradoxical. They dread sickness and war like any old woman; but will boldly face a jaguar in the woods, go through the wildest surf, over the most dangerous rapids, or swim in places full of sharks and alligators. They are grossly superstitious, and at the same time quite deficient in veneration. Yet they have many good points to set off against their faults. When working for you they will endure hunger, cold, and the greatest discomfort cheerfully, and when treated well, serve with great devotion. Their women are kind and affectionate, in spite occasionally of the worst treatment. The little government they require is carried on by the king through the head men of the villages, selected from among the oldest and most renowned for discretion and ability. By them all minor grievances are settled, while graver matters are referred to the king; they also act as quartermasters in providing men and provisions for him when he passes through their villages. The Indians are not regularly taxed, but they are expected to give contributions every year of canoes, tortoiseshell, or provisions to the king, and the head men see that this is not neglected by the respective communities. The regular taxes on imported or exported merchandise are collected by more intelligent gatherers, generally resident Englishmen.

Morality is at a low ebb among the Indians, lowest of all among the Mosquito tribe. The practice, and even the duty, of chastity is unknown, and most of the murders and bloodshed that occasionally take place are the result of quarrels about women. The laws on the subject are lax, and still more laxly carried out. An injured husband inflicts a severe beating on his unfaithful wife, and exacts goods to the value of 10 or 15 dollars from the other delinquent; and I have known men keep several wives for the sole purpose of the revenue derived from their misconduct. More frequently, however, they take the law into their own hands, and exact a more severe satisfaction than the law or custom allows. Much cannot be said of their honesty or truthfulness, but, perhaps,

it is not to be expected of a people without instruction or moral restraint of any sort.

The Mosquito Indians are excellent boatmen, and in their frail canoes they fearlessly navigate the sea, however stormy it may be. They display great daring and skill in going through the heavy surf on the beach, and will carry fresh provisions to the ships when the boats of the latter cannot go near the land. It is wonderful the dexterity with which they steer for certain banks and shoals, where the green turtle feed, far out of sight of land, and without any landmark to guide them.

The staple food which the Mosquito Indians raise is cassada and plantains, cultivated in little cleared patches along the beach and river-sides. The Indians of the interior raise Indian corn and plantains, and have always a superabundance of provisions from the superior fertility of the soil and their own greater industry. They also raise sugar-cane and a little good tobacco. Some of the villages in the interior raise chocolate, which they drink mixed with Chili pepper. They plant cotton-shrubs round their houses, and manufacture coarse cloth dyed a variety of bright colours.

The Mosquito Indians trade with the tribes of the interior for various articles which they cannot produce themselves, getting rough canoes, paddles, gourds, and calabashes, cloth, net-hammocks, skins, Indian corn, &c. &c., for English goods, salt, turtle-meat, &c. Large fleets of canoes proceed every year, in the month of May, to the hawksbill-turtle fishing on the coast southwards of Greytown, where some watch the beach at night, and catch the turtle as they crawl up to lay; and some spear them at sea with a heavy palm-wood staff, at the end of which is a notched iron peg and 20 fathoms of strong silk-grass line attached. The success of this fishing is very precarious, some getting as many as 10 or 15 backs, and some none. Others resort to the numerous keys and coral-reefs in the neighbourhood of the coast, and spear the green turtle which abound there; they get a ready sale for them in Greytown and Blewfields. That part of the tribe who live west of the Cape regularly resort to the mahogany-works of Honduras for employment, where the reward of their labour is more surely if not more easily earned. During these temporary migrations the villages are left without a man, except such as are too old to travel; and as the Indians raise no stock, it may be imagined the women are badly off for meat when all the hunters are away, but they help out their fare with crabs, oysters, a few fish caught with the line, alligator and tortoise eggs, till their natural providers return and regale them with dried turtle-meat and stores of turtle-eggs.

None of the Indians in the country can be said to practise or profess any religion. They have a general idea of and belief

in a great presiding spirit or god and in a future state, but they have no clear idea of any duties required in order to merit future happiness. They practise no religious rites of any sort, unless certain ceremonies in honour of the dead and some other superstitious practices be considered as such. In every village are found one or more persons, male or female, who undertake to cure the sick and to protect the community from evil spirits; and although their "sookias," as they call them, more frequently fail than succeed, and in spite of their palpable tricks and their rapacity, the deluded people trust them implicitly. The Indians believe that even the most trifling illness is caused by some evil spirit possessing the person, and the sookias ascribe to themselves the power of dispossessing and driving it away. For this purpose they paint their faces in some hideous devices, and then proceed to blow tobacco-smoke over the sick person, rubbing him with their hands, and muttering strange words and sounds. They fence him round with charmed and painted sticks, and forbid the approach of any woman with child, or any person who has recently assisted in burying the dead, and no person is suffered to pass to windward on any account. The actual or presumed breach of these injunctions affords a convenient loophole for want of success in the cure. For a long time after the recovery of the patient his food is brought to the sookias, who whistle for about twenty minutes some plaintive strains with incoherent muttering over it, till it is purified from the influence of the spirits. If a village is attacked by sickness, a consultation of sookias is called, who, having maturely considered the matter, and slept a night in order to inform themselves by dreams of the nature and disposition of the spirits, erect each a hut a little removed from the village, and there sit up the greater part of the night, muttering their incantations and invoking all sorts of terrible animals, real and fabulous. After they have performed these and various other ceremonies, they plant a lot of painted sticks, with a grotesque little figure in wood or wax on each, round the windward side of the village, and announce the expulsion of the spirits. But should the sickness be very obstinate, the sookias, after a consultation, inform the people that the spirits are not to be expelled, whereupon the inhabitants remove immediately, burning the infected village to the ground. The Indians believe that all game and several birds have an owner, and several sookias pretend to have seen the Master of the Warree, as he is called, whom they describe as a little man, not taller than a child, but terribly strong. He superintends and directs the various droves; drives them to their feeding-grounds, and, if they are much disturbed, leads them to remote parts of the forest. He lives in a large cave in the side of a mountain, and is attended by a guard of *white* Warree, which cannot be approached

within hearing for their excessive fierceness. Living in dark and gloomy forests, of which they do not know the extent, the ideas of the Indians naturally turn towards the mysterious and wonderful, and for want of any known inhabitants they people these unexplored tracts with fabulous monsters. The heads of several dark and shady creeks, blocked up by a mass of fallen trees and bamboos, are assigned as the abode of great "wowlas" (a species of *boa constrictor*). On paddling some distance up these creeks, presently a rumbling of thunder is heard at the head, and, strange to say, the stream immediately begins to flow upward with irresistible force, a fierce wind tears through the trees, and the unhappy victims are carried away, without hope of rescue, to the terrible jaws that await them. Into some of these streams nothing will induce the Indians to enter, though they are said to swarm with the fattest game, the private preserves of the spirits and monsters. In like manner, several mountain-ridges are the dwellings of a terrible monster called a "wihwin," like a horse, but with "jaws fenced round with horrid teeth," whose native place is the sea, whence he issues from time to time to his summer residence on the hills, and at night roams about the forest in search of human or other prey. The Indians sit round their fires at night listening to tales of the dreadful havoc this monster made in certain villages long ago: for, fortunately, these lamentable events never happen in the lifetime of the narrator. Not content with the real horrors of the rivers in the shape of alligators and sharks, they assign to various circling eddies and dark pools a not less formidable tenant, which they call a "leewa," or water spirit, which sucks down the unlucky bather and devours him unseen; this spirit also inhabits the sea, and occasions waterspouts and hurricanes. It would be tedious and out of place to describe all the customs of the Indians, so I will just give one or two specimens. When a woman is unwell, or has had a child, she is excluded from the village for seven or eight days. A small hut is built for her in the woods a few hundred yards from the rest of the village; at night some of the girls go and sleep with her to keep her company, or, if the nights are dark and tigers are known to be prowling round, her husband takes his gun or bow, and sleeps in a hammock near her. She must not handle or cook food, but all is prepared and carried to her. When well again, she goes to the river, bathes, puts on clean clothes, and returns to her household duties. Every child shortly after birth has what they call a "pew," or charm, tied round its neck by the sookias, which is a little bag, containing some small seeds wherewith to pay the price of being ferried over a certain river that separates this from the next world, should it die young. When a death takes place, they generally bury a bow and arrows, a gourd calabash, and knife,

and sundry other articles with the body, and carefully keep in repair a small hut built over the grave, in which they deposit from time to time such little offerings as a yard or two of cloth, a bunch of plantains, a bottle of rum, &c. They have also the custom of destroying everything belonging to a dead person, burning his clothes, splitting his canoes, and, worst of all, cutting down his fruit-trees. The female relations crop off their long black hair, as they wish no one else to touch what the departed liked to handle. The greatest offence one can offer is to mention the name of the dead. The grief displayed by the women is most passionate: they dash themselves to the earth till they are covered with blood, cast themselves into the river or the fire, and frequently steal away and hang themselves. The women are passionate also in their attachments, and suicides from jealousy and disappointed love are very common. Unfortunately, becoming a wife does not confine their errant affections, but often only serves to complicate matters still more. The Smoos, although they do not undergo to the same extent those voluntary trials of endurance which the North American Indians are said to be so fond of indulging in, yet practise something of the same sort at their drinking-bouts. As soon as they have got excited, the young men assemble together to dispute which is the strongest and most worthy of the attentions of the fair sex. Strange to say, instead of settling the question by contending one with the other, it seems more congenial to their nature to do so by trying which can endure the most from his antagonist. For this purpose the sufferer stands just as an English boy does at leap-frog, and the executioner strikes his back as hard as he can with his clenched or open hand or the point of his elbow, and to endure this without a groan is the pinnacle of their aspirations. Death sometimes occurs from the effects of it. Unlike what is usually the case with other men in similar contentions, these retire from the inspiring presence of the admiring fair, and report only conveys the deeds of the brave.

It is difficult to imagine the spirit that animates them to these painful trials; for I have known men long past the prime of life, and in possession of the persons if not the affections of a harem of wives, enter with gusto into the strife, and return covered with glory and bruises. This they call "*lowta*," and a young man is not worthy of a wife till he is able to endure with fortitude a stout application of the elbow to his back. There seems to be a propensity in the Indians to torture themselves in emulation. I have often seen little boys seat themselves round the fire to see which could endure longest the application of small lighted sticks to their legs or arms.

Christmas is a period of great festivity with the Indians, and

for about two weeks the scenes of riotous drunkenness are quite appalling. Every house then prepares a quantity of intoxicating drink, some as much as six or eight casks full. These drinks are generally prepared from the cassada, but often from sugarcane and pine-apples. The cassada mixture, or "mishla," as they call it, is prepared by boiling a quantity of the roots, of which about a third is chewed by the women and spat into the casks; the rest is pounded in a mortar and mixed with the chewed part, and some cane-juice and hot water poured into it. It is then covered with leaves, and left to ferment for two days, when nearly all the neighbours are invited to come and partake, and the entertainment generally lasts two or three days; as fast as it is finished in one house the company adjourn to another and another, till they have made the round of the village. The guests are sometimes invited from a distance of 60 miles, and in their turn they invite their hosts. The drink resembles buttermilk: it is sour and very strong. The other drinks, made of fermented cane-juice or pineapple-juice, are delicious, and make those who indulge too freely furiously drunk. The drinking scenes never pass off quietly; as soon as the Indians get excited old quarrels are renewed, old grievances raked up, and high words are not long in being followed by blows. The women fly to hide all the weapons they can find, and then lend their kindly aid to separate the combatants; but, in the state in which the men are, their mediation is too often rewarded by savage blows: yet the devoted creatures pay little heed to their own wounds as long as any one dear to them is in danger, and they generally succeed in restoring peace, which is again and again interrupted till their most potent enemy, drink, has laid them all in the dust together. In these brutal exhibitions all the bad propensities of the Indians are displayed in their worst lights, and it is not till their own healths are on the point of giving way that they cease from their wild debauch and resume the quiet possession of their faculties.

The Smoos, the most numerous tribe next to the Mosquitos, inhabit the heads of all the rivers from Blewfields to Patook. They may be distinguished from the Mosquito tribe by their stolid, heavy expression, their broad faces, and flat heads. They have an absurd custom of flattening the heads of their children, as they think nothing so ugly as a round forehead. For this purpose, when the child is about a month old it is tied to a small board, and a flat piece of wood is placed over the forehead and tied by strings to the board at the back with a gentle pressure, which increases as the head grows. This is not removed for several months, and, when it is, the expression of the best-looking child is ruined. The operation gives great pain to the child; in vain they try to beguile its continual crying by tying to the board all

sorts of jingling shells and rocking it about suspended by a string, and many fine children are sacrificed to this absurd custom. The Smoos are a simple, goodnatured, hardworking people, ready to oblige, and easily imposed upon, for which reasons the Coast Indians affect to hold them in supreme contempt. They are much fairer than the Mosquito Indians, and some of the women almost approach to white. The men are the most expert hunters that can be imagined, and the skill they display in finding their way through the pathless woods is quite astonishing. They pursue their game through dense tangled thickets with the sagacity of the bloodhound; they follow the track of animals which to other men is quite imperceptible; and amid the confusion of cries and sounds in the forest the right one is noticed at once, however faint and distant. Their most effective weapon is the bow and arrow, but some use and prefer firearms. In this way they earn a hard, scanty subsistence, infinitely preferring it to the surer method of raising stock, which they never can be induced to do except a few fowls, which they seem to keep more for the look of the thing than anything else, as they very seldom eat them. The customs of the Smoos are similar to those of the Mosquito Indians already mentioned. They have the same drinking orgies at Christmas and in honour of the dead, and on these occasions the men paint their faces most elaborately with red and black paint, they tie a band of cotton cloth round their head which is covered with the most brilliant feathers, arranged in patterns sewed on it, and a broad strip of the same hangs down their back to the hips, while a plume of the beautiful tail-feathers of the red macaw sticks up over the forehead. Their only clothing is a waistcloth of their own manufacture, of various colours and patterns, and interwoven with the snowy down of the Muscovy duck and eagle. The women are more simply dressed than the men on these festivities, wearing a broad wrapper of print or blue cotton-cloth, which reaches from the waist to the middle of the leg; and the upper parts of the body, being naked, are smeared all over with a very light tint of red, which just serves to give a glow to their beautiful brown skins; round their necks are hung pounds of small red, white, and black beads, and their small wrists and ankles are adorned with the same.

The women of the Smoo and other interior tribes are far more industrious and ingenious than those of the Mosquito tribe. At their little settlements all day long one is dinned with the continual hammering necessary in the process of making the India-rubber-bark cloth, and others are occupied in weaving cloth, spinning yarn, making hammocks, bead ornaments, &c. Occasionally they follow their lords to the woods, and carry out heavy loads of game, and they show great patience and endurance in

carrying loads of provisions and firewood over long and rugged roads.

Like all the other tribes, the Smoos may have as many wives as they can keep, but the generality of them have one. When there are several wives in the same house, the oldest takes charge of the others, and directs them in the various duties of the day; but the youngest is generally the favourite of her husband, and goes with him in all his hunting and fishing expeditions. Each wife has her own fireside, and cooks every day her own pot; so that when the lord of the house sits down to dinner he has portions brought to him by each, which manner of proceeding is anything but economical. They have no marriage ceremony, nor anything like one. When a man sees a girl he fancies, he asks the father for her, and, if he consents, the girl is sent with her bundle of clothes and bedding to her new home. She is never consulted in the matter, and has no option but to give in. If, however, her opposition is very violent, they generally yield to her wishes: sometimes not even in that case. Girls are chosen as wives during their earliest childhood; nor is it always considered necessary to wait till they are of a marriageable age before they are taken into the husband's charge. A widow is always considered in a certain degree the property of her late husband's relations, and they must be consulted and a price paid them before she is allowed to accept another husband, which curious fee is called "*piarka-mana*," or widow-money.

The Twakas are only a tribe of Smoos, with a slightly different dialect, and do not number more than 200 or 300 souls. They are a fine-looking people, well made, strong, and very fair; they do not flatten the forehead. They dwell along the Twaka river, which is a branch of the Prinz Awala.

The Toonglas inhabit along the other branch of the same river; they seem to be a mixed race between the Smoos and Mosquito Indians, and their dialect is nearly pure Mosquito with a large mixture of Smoo words. They are much darker than the Twakas, and resemble the Coast men as much in their laziness and rascality as their complexion, but there are some fine fellows among them. They never construct such large and comfortable houses as the Smoos and Twakas; in the dry weather they live in miserable little sheds on the sandbanks close to the water, and of course, when the floods come, they are summarily ejected, and their sheds carried away to sea. During the rainy season they live upon the banks out of reach of the floods, but, as they intend to remove to the sandbanks when the dry season returns, they take no more pains with these houses than with those that were swept away.

The Payas are a pretty numerous tribe, and inhabit the heads of the Black and Patook rivers. They seldom visit the king, and

are only nominally subject to him; they resemble the Smoos very much, but speak quite a different language.

The Ramas inhabit a small island at the southern extremity of Blewfields Lagoon; they are only a miserable remnant of a numerous tribe that formerly lived on the St. John's and other rivers in that neighbourhood. A great number of them still live at the head of the Rio Frio, which runs into the St. John's River at San Carlos Fort. These latter are quite wild—if holding no intercourse with the rest of mankind can be called so; they attack every person that attempts to ascend their river, and some twenty years ago killed the Spanish commandant of San Carlos, and nearly annihilated the party of soldiers that accompanied him for the purpose of inspecting the country. Their secluded life, and the terror they inspired on that occasion, is perhaps the origin of the reputation they bear as cannibals; and a wag of an American once said to me that they always sat down to dinner with a cold missionary on the sideboard.

The language of the Ramas is different from any other spoken in the country. They are quite as expert boatmen as the Mosquito Indians, and more powerful and enduring; they are certainly the finest set of Indians in the country,—large, heavy, athletic men, with stolid and even severe countenances. They use immense heavy bows, upwards of 6 feet long, but firearms are now their principal weapon. Every Christmas numbers of them come up to the town of Blewfields, and stroll about the streets in the most appalling state of riotous drunkenness.

The Cookras seem always to have been wild, like the Ramas on the Rio Frio; and from the traditions on the subject they must have been reduced to live in that manner from the terrible wars and persecution carried on against them by the Mosquito Indians long before the Creoles and Negroes were settled in and around Blewfields. Thirty or forty years ago there were still numbers of them living in the forest round Blewfields. There are eight or ten individuals of this tribe living near Pearl Key Lagoon, who were captured when children, they say; and as none of them are ever seen now-a-days, it is more than likely that the tribe is extinct; and, in fact, wild savages—hardy as they are—cannot exist long in the manner they are represented to have lived. Their axes and weapons were of stone, and numbers of these are dug up round Blewfields; they slept on the ground on a few leaves, and sheltered themselves from the rain with the leaves of the swallow-tailed palm piled on leaning branches. With big sticks they thrashed down and pulled up the long grass on the banks of the creeks and rivers, and there planted a little Indian corn and plantains, deriving the rest of their subsistence from the game which they

killed with their flint-headed arrows; and eboe-nuts, bread-nuts, and mountain-cabbage (the heart-leaves of the mountain cabbage-palm) eked out their miserable existence. Their covering was the inner covering of the India-rubber tree beaten out, and their cooking utensils pots of clay and calabashes. Of course they had no canoes. In Blewfields and the forest round are numbers of large mounds, containing many thousand tons of cockleshells, and filled with broken pottery, stone axes, rude little images of human, warree, and parrots' heads, and horns of the warree and manatee. However plentiful the cockles may have been in Blewfields Lagoon, it must have taken centuries to accumulate such heaps of the shells, and they are attributed to the Cookras who lived round the shores of the lagoon. It is strange that no oystershells are found in these mounds, although that shellfish is now by far the most plentiful; the roads in Blewfields are "metalled" with the shells from these heaps. Although numerous ruins, indicating a large, settled, and comparatively civilised population, are found in the surrounding Spanish states, especially Honduras, the Mosquito territory is entirely destitute of anything of the sort, and the inhabitants for ages back must have lived in the same wild, rude state they do at present. I have no doubt the peaceful and industrious settlements in Honduras and Nicaragua were periodically disturbed by inroads of the then numerous and fierce tribes issuing from the forests of the Mosquito shore, into which it would be vain to pursue them, and making off with their booty before a sufficient force could be collected to resist them; and this predatory practice they seem to have continued long after their more peaceable neighbours had the misfortune to have the Spaniards for their protectors. I have seen a copy of a despatch sent by a governor of Cartago, in Costa Rica, to the captain-general of Guatemala, in the year 1727, grievously complaining of the inroads of the Mosquito Indians, who had burned several fine towns and made the country desolate. The despatch detailed a project for capturing the headquarters of the marauders, the settlement of Cape Gracias à Dios; recommending the construction, under the protection of the guns of the ships, of a fort from which inroads could be carried in armed boats up the Waux and other populous rivers. It stated that the Cape settlement could raise 1000 men in a few hours: the total inhabitants now do not exceed 300. Evidences of the rapid decay of all the Indian tribes in the Mosquito territory are painfully numerous all over the country in old groves of fruit-trees, in the forest, and along the now silent banks of the rivers, and the sites of old villages abound in some of the savannahs. The Sookias confess that the land is possessed by legions of evil spirits, whom they have no

longer power to resist as their forefathers did ; and I have heard many of them, when reflecting on their younger days, prophesy that before many years the land would be without an inhabitant. Numerous reasons are assigned for the falling off of the Indian race, such as strong drink and the diseases introduced by the whites ; but any one who has studied the Indians of this country will be convinced that to their own vices they are indebted for this great punishment. As the natural result of the profligacy of both sexes, large families of children are seldom seen ; and poor living, bad clothing, and careless exposure to all weathers cut off the delicate and feeble both in infancy and old age. Although hardy and tough to an astonishing degree, yet they are liable to sudden and violent illnesses, brought on by excessive exposure. Fevers, consumption, and other complaints of the vitals are the most fatal disorders ; not a few of them are afflicted with loathsome diseases of the skin ; and the children suffer greatly from worms, for which they know no effectual remedy. If an average could be taken of their lives, I am sure it would be found very short indeed. Hale old men and women are as scarce among them as they are common among the whites and negroes. As I said before, there is no record of any epidemic sickness having ever affected these Indians, and their manner of living is quite unfavourable to the spreading of it ; neither can drink be assigned as the cause of their decadence. There is a great difference between the continual soaking of the habitual drunkard and the wild drinking-bouts the Indians indulge in twice or thrice a year, which only last a day or two, and any bad effects are soon dissipated by fresh air and exercise. The Coast Indians drink twice as much as those inland, and at the same time are on the whole much healthier, which can only be accounted for by their superior living : for while the sea and the brackish lagoons afford them abundance of turtle, large sea-fish, and shell-fish, the poor Indian in the interior hooks a scanty meal for his family of small river-fish by much patience and toil, or pursues, often unsuccessfully, the fleet game through the tangled woods. But one will naturally ask why the causes that are now acting so fatally against the tribes of this country should only of late years have begun to act. It is reasonable to suppose that, when the Indians were more numerous, they not only lived better, but had a better government, and better laws more rigidly enforced. History points to numerous instances of the deterioration of the character and morals of nations ; and the common intercourse of the Indians with the pirates and buccaneers of former times, and with unprincipled sailors and traders down to the present day, may gradually, by example and precept, have subverted all their good institutions and brought them to the state they are now in. None of the tribes in the country appear to

have a spark of their former warlike spirit left, which must be owing to the long protection accorded to them by Great Britain during the last 200 years, who having gradually brought them to the state of peaceful dependents, has coolly handed them over to the Nicaraguan Spaniards, whom the natives detest, and once kept in terror of their name. If the Mosquito Indians chose to resist this arrangement, I believe the Nicaraguans would find they had caught a Tartar, for their impenetrable forests are strong fortresses when garrisoned by hostile Indians.

The warm damp climate of the Mosquito shore favours the growth of forests of unrivalled luxuriance and grandeur: it would be foreign to the subject of this paper to describe the innumerable varieties of fine trees that grow in them. At present mahogany is the principal export, and the supply will last for centuries. It is singular that Blewfields is the most southern river on which mahogany is found; here it grows in abundance, but the Cookra River, 16 miles farther south, has none. The pencil or Spanish cedar grows in great abundance and of the largest size. *Lignum vitæ* grows to a large size, besides a great number of exceedingly hard and durable woods which are unknown in this country. Large forests of pitch-pine are found in the northern parts of the country; the wood is very dense and tough, and contains an unusual quantity of tar. Of the numerous varieties of palms there are few besides the cocoa-nuts that yield useful fruit. The "soopa" is a prickly-palm, about 30 feet high; it grows both wild and cultivated; it produces large bunches of fruit about the size of a potato, with a deep-orange skin when ripe; inside is a small black kernel, and the substance surrounding it is, when boiled, dry and mealy, and eaten with salt meat is one of the choicest morsels to be had in the country.

The hone-palm is the same which yields the palm-oil of commerce. The Indians boil the orange-coloured nuts till the stringy pulp falls away from the stone, they then squeeze and throw away the fibre and drink the rich yellow soup that remains, sometimes mixing it with mashed ripe plantains; it is exceedingly luscious and rich, and is not likely to be relished at first by a stranger, but when the taste is acquired he will duly appreciate it.

Cocoa-nuts, Indiarubber, sarsaparilla, copal, balsam copaiba, vanilla, and silk-grass, are among the natural productions of the woods; sugar, coffee, chocolate, ginger, arrowroot, cotton, &c., grow to perfection: the cultivation of the latter for commerce would perhaps be unsuccessful from the quantity of rain that prevails. All vegetables and fruits that are found in the West India Islands grow here to perfection; the latter scarcely possess the flavour and sweetness of those growing in the surrounding states, from the deficiency of dry bright weather.

The woods and savannahs are infested by the three varieties of the tiger peculiar to America, the black and spotted jaguar and the puma; they are not often dangerous to man, but destroy much cattle. The former is a fierce and powerful animal, and very dangerous to meet alone; but it is not very common except in the mountainous parts of the country. The spotted jaguar is also a powerful animal, and will kill and carry off the largest ox; the Indians are occasionally killed by them, and I knew one man who was dreadfully wounded and disfigured by one attacking him after being wounded with an arrow. I have killed them, however, with large shot. The puma is the most common and the most destructive: it seldom attacks a man. The tiger-cat is a beautiful little animal, and very destructive to poultry; it is twice the size of a cat, brindled with brown and black, and with a white chest and belly. There are two species of the opossum which are equally destructive to poultry; the smallest is mouse colour with soft fur, and the largest of an iron-grey with stiff coarse hair: this latter when disturbed emits a disgusting smell.

The "araree" or bush-dog is a large species of the weasel, about the size of a fox, of a glossy black, with a long sweeping tail. This animal, besides birds and poultry, eats fruit of all sorts, and is very fond of ripe plantains.

The ant-bear is an extraordinary animal, well known to naturalists: there is also another species of the ant-bear in these woods which is good eating.

The "warree" and pecay are species of the hog: the former is much larger than the latter; they congregate in large droves, and are occasionally very fierce and dangerous to attack; the flesh is excellent eating; both the species have a gland on the back, from which they emit a strong scent that is perceived miles off.

Two species of deer, the tapir, the agouti, the capibari or water-hog (a very inappropriate name, as it is one of the rodentia), and three species of monkeys abound in the woods. Any one who is acquainted with the fauna of Guiana and northern Brazil will have a very fair idea of the animals to be found in this country.

Curassows, quains, quails, partridges, and five or six species of pigeon are among the game-birds; and the toucans, the trogons, the macaws, and parrots adorn the scenery with their brilliant plumage. There is one large eagle which is upwards of seven feet across the wings, and hawks of every variety abound; the beautiful king vulture and the common turkey-buzzard purify the land from all dead carcasses.

Nor are the banks of the rivers wanting in song-birds to cheer the early dawn. The beautiful Banana bird has no match in variety of notes, though surpassed in sweetness by several others; the notes

of the "Peetu Yoola" (pine-apple bird) are just like a chime of church bells in a sweet silvery key, and uttered with measured composure. When dusk sets in, from some lonely ravine are heard the clear ringing notes of a covey of birds called the "Yàrring Yoola:" these notes are uttered by the males of the little flocks, and are as if some one was tuning all the higher notes of a piano. All the birds lay as in Europe in April and May, and raise their broods before the rains and storms of June and July.

There are not many species of venomous snakes in the Mosquito country. The most common is the tommygoff, as it is called by the negroes; this reptile is very like the rattlesnake, both in size and colour, but without the rattle. Its bite is very bad, but not more than, I should say, 20 per cent. of those bitten die of it; the bite is more often fatal to white people and negroes than to the Indians, though the former have remedies which the latter have not. A small yellow snake not more than 8 inches long is very venomous, and the "Barber's pole," a beautiful snake marked with rings of yellow, black, and scarlet, is said to be fatally venomous; but I think it is very doubtful, as it has no poison-fangs. Among the nonvenomous is a species of boa constrictor, of which I have seen one 16 feet long, but the Indians say it grows much larger.

There is a very great variety of harmless snakes, many of the most beautiful colours. The "Plupau taya," a large snake very like the rock-snake of India, is often very savage; myself and ten men had on one occasion to jump overboard and leave the canoe to one of these snakes which we had disturbed in fun.

The great Guana lizard is found in countless numbers along the rivers, the great Indian figs which hang over the water being their favourite resort; when disturbed they plunge into the water from the tops of the highest trees, and sometimes fall into a passing canoe and are dashed to pieces. The flesh of this lizard is unsurpassed in delicacy and flavour, and the eggs are very rich. Alligators, of course, abound, and are seen basking on the sandbanks in hundreds. There is also a small species of crocodile that frequents quiet weedy pools and places full of waterlilies and rushes; it is about 5 feet long, and its flesh is eaten by the Indians, but it has a disagreeable taste of musk, otherwise it is white and tender.

A large lizard called "Ishilly" is also good eating; it is green with brown markings, and has an immense comb on its head and back: this species is chiefly found on the keys and islands. Both this lizard and the guana fall a prey to hawks and eagles, and even the puma does not despise them.

The house-lizard is a lovely and amusing little creature; the

male is black with an orange-coloured head, and the female dusky, or the colour of wet ashes with darker spots. It is most amusing to see them coursing over the floor in pursuit of flies, creeping almost imperceptibly till within a few inches and then darting upon them; when the rest discover that one has a large fly, they immediately give chase to it to try and get a piece. Their eyes are very keen, and on perceiving a fly alight on the walls, many yards off, they creep slyly round the picture-frames, &c., to hide their approach. They lay the most lovely little white eggs, with a *hard* shell, which is very unusual in the reptile tribe.

One species of lizard, called by the negroes Galley asp, is said to be very venomous; but as they attach an absurd story to it, I am not sure whether the one assertion is more credible than the other. They say that on biting, the asp immediately runs for the nearest water; the person bitten must do the same, and whichever reaches it first will survive. This lizard has a hideous appearance: its head is short, flat, and broad, with a large mouth armed with rows of small sharp teeth; the body is thick and the tail stumpy, and its colour dusky-grey, with brownish blotches; it chirps at night in a shrill, harsh manner.

The numerous sweet-smelling flowers which chiefly grow on large trees are visited by thirteen species of bees, by which the woods are stored with abundance of wild honey of the most various tastes and colours. These bees vary in size from that of the common English bee to that of about twice the size of a flea. The honey of some is thick and yellow, and of some it is nearly as liquid and as pure as spring water; one species produces honey of a dark indigo blue, which is very sweet and acid, and purges violently if too freely indulged in; all the honey-cells of these bees are circular; the cell of the largest is the size of a grapeshot, that of the smallest a little larger than a pea. None of these bees sting, instead of which they bite with their forceps; and one species emits a minute drop of a white liquid which raises a blister on the skin of a person, and is apt to turn into a sore. One species, which I believe to be more allied to the wasps than the bees, builds on the branches of high trees a large hanging paper-nest, sometimes 6 feet long and the same in circumference; this nest contains (in the month of September) several gallons of honey, and the cells are hexagonal.

Wasps are very numerous, and sometimes troublesome; the largest species of hornet will give a man fever from the pain of its sting. One species frequent the eaves of the houses; the rest suspend their large paper-nests on high trees, except one which prefers the little clumps of tangled creeping-plants and bamboos that hang low over the rivers; and I have had to jump overboard

on accidentally striking the bush with the boat, where, if we considered, the danger was greater in the remedy adopted, from the number of sharks in the water.

The ants are by far the most interesting insects in the tropics: it would take volumes to describe the innumerable varieties and their habits; after twelve years of observation I believe I had not yet seen all the species. There are two distinct classes, the predaceous and the herbivorous ants; the largest of the former is about an inch long, and the sting is excruciating. The most remarkable are the "Tarring" or marching-army ants: these make periodical forays in search of prey; issuing from the woods just before the heavy rains in countless millions, they swarm into the houses at all hours of the night or day, summarily ejecting the people from one or all of the rooms. But the service they render is more than equivalent to the temporary inconvenience, as they clear the house of all reptiles and insects, even to the wasps'-nests under the eaves, which are ravished of their grubs in spite of the ineffectual rage of the parents.

The red "Weewee" is a great nuisance in plantations of cassada, yams, and maize; they strip the plants of the leaves, which they carry away in large pieces, and their roads (which are sometimes half a mile long) are a moving mass of green: when they encounter a small stream not more than a few inches wide, they cast in hundreds of their burdens till it is bridged over. Some of the nests of this species take up nearly an acre of ground, and are only distinguished by the bushes growing round being all stripped, and by the innumerable little spouts or craters from the galleries below. I have known a horse fall into one of these nests and die there, being unable to extricate itself.

The white-wood ants are very destructive, consuming all the soft wood in a house, and mining garden-paling, &c. They construct upon trees a large black nest full of arched galleries, whence covered roads lead in all directions for a long distance. When exposed outside of their defences these ants fall a ready prey to various others, and to poultry and birds.

Some make a flimsy nest suspended to the end of a twig; and when the tree is accidentally knocked against, the bottom of the nest falls out and the person below receives on his head a shower of enraged ants. Many of these ants on being touched leave the most nauseating smell on the fingers, which remains for hours, even although the hands are washed with soap.

The sea and rivers swarm with every variety of tropical fish. Sharks and saw-fish are the terror of the sea, and infest the rivers below the falls: it is very dangerous indeed to bathe in them till you get up among the sands and shoal water.

The finest fish in the country is found in the brackish lagoons ; it is a large species of mullet about 4 feet long. It is called Callapiever by the negroes, and Cookally by the Mosquito Indians. The only way of taking it is by the harpoon, as it will not take bait and readily jumps out of a net ; with a harpoon and torches at night the Indians kill great numbers, especially in the months of November and December.

The mullet is a most delicious fish ; it resembles the herring, and is found in large shoals in the lagoons. Sometimes in still dark nights, if you merely strike the side of the boat with your hand, they jump out of the water in thousands, and numbers fall into the canoe ; there is not a little danger of getting your eye knocked out. The Callapiever have the same habit of jumping out of the water on still nights on hearing any sudden noise, and I knew a man who was nearly killed by being struck on the side of the head in this manner. "Tooba" is a fish the Indians of the interior principally live on : it is about 9 inches long, 6 inches broad, and about twice the thickness of a person's hand ; of a purple colour upon the gills and back, and blue underneath ; it is found alive in the lagoons and the heads of the rivers ; it delights to cruise round old stumps in the dark shadow of overhanging trees, and is shot by the Indians with arrows.

"Srik" and "Saasing" are magnificent river-fish, unequalled except by the salmon of northern countries. The former is bottle-green above and silver colour below, and attains the size of 3 feet ; it affords excellent sport, and takes flies, worms, and various berries, but its choice morsel is the Indian fig, and hundreds of them congregate under these trees to eat the fruit that drops into the water. The Indians take advantage of this, and make their bait drop into the water like the fruit, when there is a rush of fish to seize it. The saasing is a thick heavy fish, clouded-brown and grey ; it delights in quiet pools where grass and reeds grow out of the water, and is never found among the rapids and falls as the above is ; it takes bait readily, and is easily killed with the arrow.

There is an infinite variety of fish in the creeks and rivers of this country, from the "Tarpum," which is 6 feet long, and weighs upwards of 150 lbs., to the blim, which is not more than 3 inches long.

The Manatee abounds in the extensive lagoons, and as far up the rivers as the sea-water reaches. The flesh of this animal is very like veal : it is streaked alternately with layers of fat and lean, and preserves well with the least possible quantity of salt ; the Indians merely dip it in the sea and hang it in the sun or smoke.

There are no fine shells on the Mosquito coast, owing to the sandy beaches, but the coral of the keys and islands is exceedingly

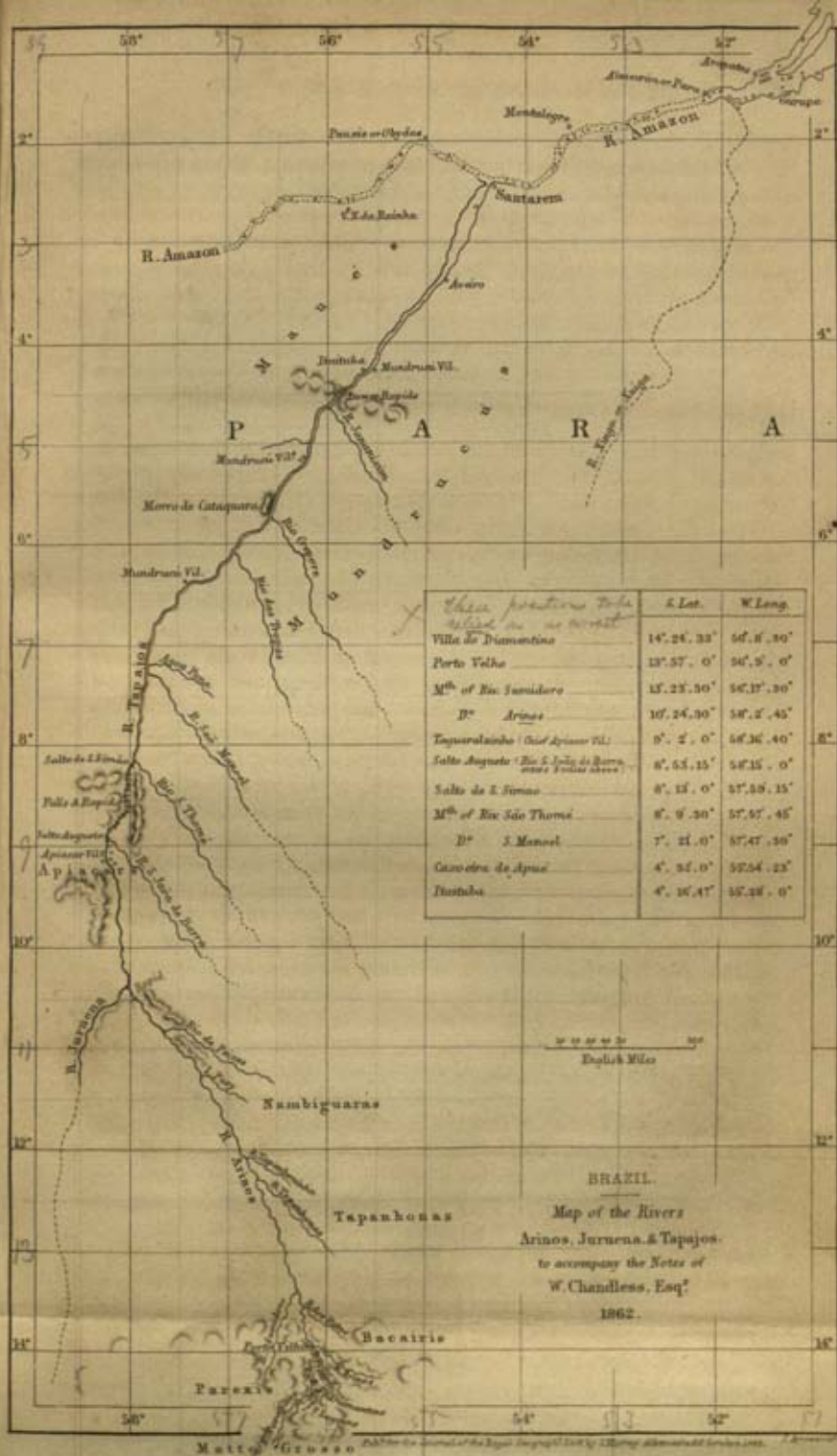
beautiful. When living in their native element, the various sorts of coral are covered with a gelatinous matter of the finest colours; and looking out of a boat on a sunny day on the groves of coral, sea-fans, sponges, and polypi, with the brilliant colours dancing in the unsteady water, and gaudy fish gliding about among the branches, one can imagine himself looking through some brilliant kaleidoscope.

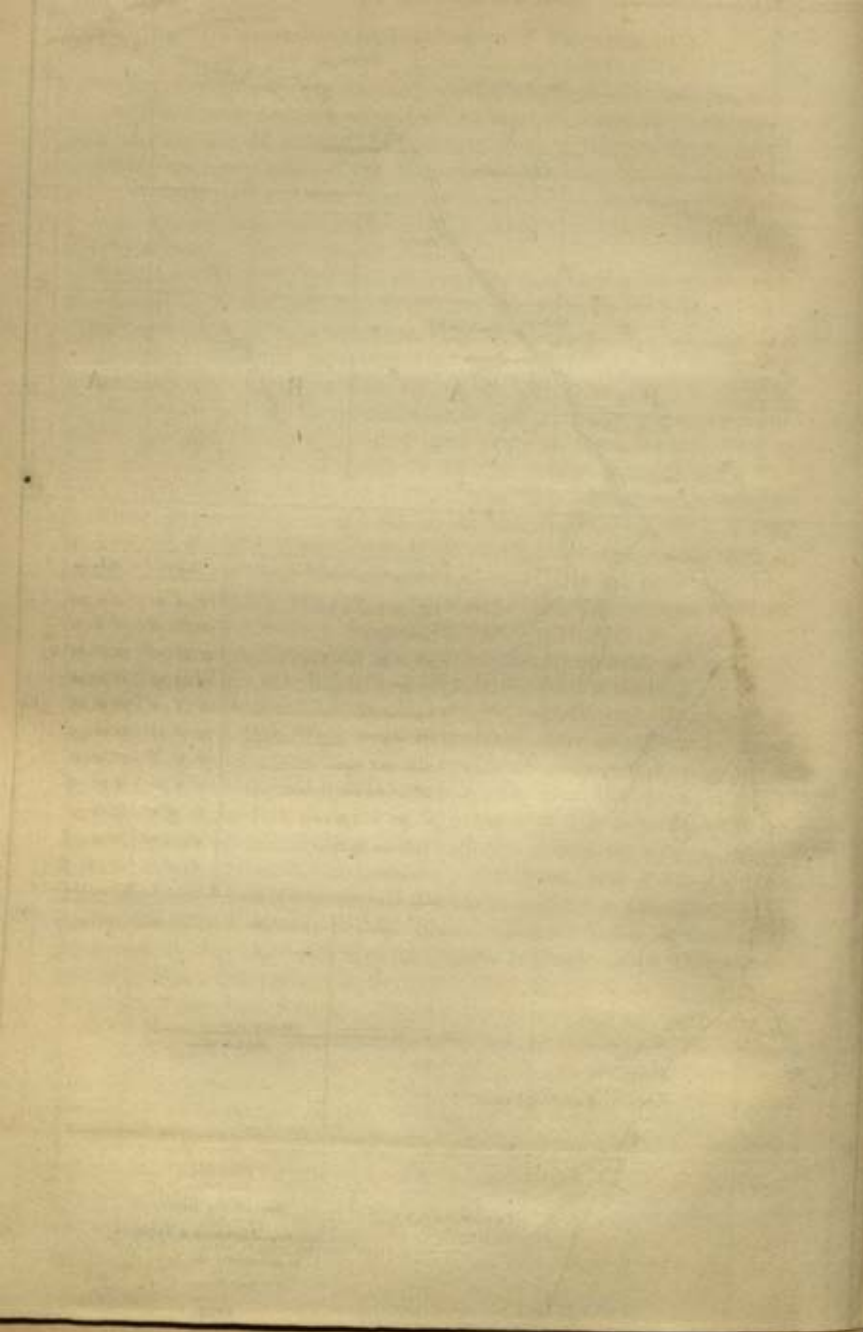
Immense lobsters, conchs, and whelks the size of a man's fist, are found in abundance at these coral-keys, and also a huge crab about the size of a soup-plate, with a lovely pink shell, spotted with white. Hermit-crabs roam at night over these little islands, disturbing the weary boatmen by biting their toes, fingers, or any exposed part of the body, and demolishing any remains of food left in the pots; during the day they have all disappeared, snugly hid under little tufts of grass or at the roots of trees. In the quiet bays, protected by coral-reefs from the trembling breakers, flocks of grave pelicans sail about on the water, with their heads thrown back, and their long bills resting on their breasts, or tumble headlong from the air among the shoals of sprats, driving them in a silvery shower out of the water. The predaceous frigate-bird pursues the snowy seagull screaming round the bay, and amusing the spectator with its manœuvres to escape, till wearied out it lets fall the coveted fish, which is seized by the other before it reaches the water; along the glaring sandy beach parties of little snipes and sand-pipers scamper along in eager pursuit of their prey, which is washed up in the rolls of seaweed by the little waves. The white circle of breakers on the reef, the dark blue sea outside, the calm bay with its back ground of rich foliage, and the light feathery clouds drifting over with the steady trade wind, form a *coup d'œil* only to be imagined in the dark and stormy north. The Mosquito country presents a rich field for the naturalist; its plants, birds, and insects will be found different from those of the surrounding Spanish states, and it has scarcely been visited by any scientific explorer.

XVIII.—*Notes on the Rivers Arinos, Juruena, and Tapajos.* By
W. CHANDLESS, Esq.

Read, May 12, 1862.

THE accompanying map is not offered as by any means accurate in detail, my observations having been far too few, chiefly owing to the difficulty of finding clear ground, and partly on account of





bad weather. The latitudes of the following points may, I believe, be relied on, at any rate, as correct to the nearest minute:—

	Latitude S.			Longitude W.		
	°	'	"	°	'	"
Villa do Diamantino	14	24	33	56	8	30
Porto Velho	13	57	0	56	9	0
Mouth of River Sumidoro	13	23	30	56	17	30
Mouth of River Arinos	10	24	30	58	2	45
Taquaralzinho (chief Apiacar village)	9	2	0	58	16	40
Salto Augusto (river S. João de Barra enters) 3 miles above)	8	53	15	58	15	0
Salto de S. Simão	8	13	0	57	59	15
Mouth of River São Thomé	8	9	30	57	57	45
Mouth of River S. Manoel	7	21	0	57	47	30
Caxoeira de Apuê	4	32	0	55	54	23
Itaituba	4	16	47	55	38	0

The rest of the observations were taken at unimportant points: none were taken between the S. Manoel and the lower rapids, so that that part of the river is mapped from dead-reckoning only. The longitudes are given as approximations only, being the results of a single chronometer: they depend also to some extent on the longitude of Diamantino; that I have given is the mean of seven sets of lunar distances—four west, and three east. Having broken both my barometer and a sympiesometer (the latter kindly lent me by C. B. Lane, Esq., C.E., the chief engineer of the Brazilian Government), I had no means of ascertaining the height above the sea. The tributaries I have marked merely to indicate the position of their mouths, not as implying any knowledge on my part regarding their actual course.

The various streams that run from the province of Matto Grosso northwards to the Amazon, or south to the River Plate, all take their rise in what, though commonly called a serra, has in reality nothing of a mountainous character. It is simply a high range of country, varying but little in its general elevation, though deeply grooved by the valleys of the rivers: around these one finds more or less of virgin wood; the rest is "campo," that is pasture-land sprinkled more or less thickly with stunted trees, in parts including the quina-tree, the same the people told me as that of Peru and Bolivia, though here but little use is made of it. This range seems to consist mainly of sandrock and clay: in general it drops steeply and often precipitously to the lower country, the plain below appearing as a sea with deep bays and inlets. At the foot of the range, in one of these inlets, stands the Villa do Diamantino (in lat. $14^{\circ} 24' 33''$ s.; in long. about $56^{\circ} 8' 30''$ w.): the River Paraguay rises about $10\frac{1}{4}$ miles south, and $4\frac{1}{2}$ west of this; but its course at first being north-east, it enters the plain 2 or 3 miles to

the eastward, and gradually bending west, passes some 3 miles south of the town, this being its most northerly point. The River Diamantino, on the contrary, comes from the north, and passing close by the town falls into the Paraguay 5 or 6 miles below; its whole length, omitting the smaller bends, not being, I think, over 15 miles. The River Preto rises about 10 miles east of the town, and the port on it is about 15 or 16 miles north-east, as the crow flies. Canoes have now and then been brought over the watershed: while I was at Diamantino, one of about 15 cwt. burden that had come from near Santarem crossed and went down the Paraguay to Villa Maria. The River Preto from the port to its mouth is a narrow stream, as tortuous as a meadow-brook, never more than 20 yards and seldom 15 yards wide; and often completely barred by trees fallen across from bank to bank: as far as I could see, not a single stream enters it during the whole distance. A few miles below the mouth of the River Preto (which enters on the left) is the Porto Velho, or old port of the Arinos, almost exactly north of Diamantino: on account, however, of the distance and bad road it is now not much used.

The River Arinos here is about 70 yards wide; its current $1\frac{1}{2}$ miles an hour at this time (June) except on shallows; wood on each side, the ground in general only a few feet above the river-level. In a few places there are high clay-banks, almost cliffs; at one of these, the Barranco de Pitas, on the left bank, there was formerly a settlement, the *cascalha* (diamond formation) being rich. Lower down, at the mouth of the River dos Patos, a small tributary, the Bacairis, a small and very timid tribe of Indians, used to be met with; but, owing to the attacks of stronger tribes, they have latterly withdrawn more towards the head-waters of the Arinos. Ten or 12 miles above the Sumidoro, also, there was another settlement chiefly of cattle-farmers; but it has been long since abandoned. The distance from the Porto Velho to the mouth of the River Sumidoro is barely 40 miles in a straight line, but by water 80 miles or more, as the river winds very much here, some reaches even running nearly south-east.

The River Sumidoro is about 40 yards wide at its mouth; it enters with a strong stream of exceedingly clear water, and at once sensibly widens the Arinos. Some years ago the Government of the province sent a party to explore this river; they reported it not navigable, as in parts the water passes under rocks; they prevailed on the Parexis Indians,* an indolent, inoffensive tribe,

* I made a list of a good many of their words, which I have since lost. The names of the various parts of the human body mostly have the prefix "no:" for example, "nosopos," the eyes—rather an European looking word; "nocanahá," the arm; "notodoni," "nocodoni," "nocanti," "noti," other parts of the body; but "noniti," the necklace of beads. "Coriogho," a bow; "aicori," arrows; "olati," a comb; "kesé," a knife. These are all I can recollect.

settled near its head-waters, 10 or 12 leagues from Diamantino, to move nearer to the town, where they occasionally come to trade, chiefly in the sale of sieves, whence they are now more commonly known as "Penneireiros." A day's journey below the Sumidoro, one is in the country of hostile Indians, the Tapanhonas and Nambiguaras, who frequent both banks of the river, but chiefly the right bank. These Indians have frequently attacked passing canoes, and seem to reject all attempts at intercourse. Senhor Benedicto França, a gentleman I met at Diamantino, and who gave me much information respecting these rivers, told me that on one of his voyages down he left looking-glasses, knives, &c., at most of the places of resort of these Indians: on his return some months later, at one of these places the Indians beckoned to him, and when he got close began to shoot at him; at other places he found they had examined the things he left, but carried nothing away. Here the river widens, and the reaches are much longer, and vary less from the general direction. Hereabouts, too, the bacava and inajá palms begin to appear: higher up one sees only the pindorval and buriti; from groups of the latter palm, towards evening, the blue and yellow macaws flew out as thick as rooks around a rookery. The maté-plant was pointed out to me on this upper part of the river, but it is a plant I am not acquainted with myself.

About lat. $11^{\circ} 30'$ s. the river becomes rocky, and separates into numerous channels, forming a labyrinth of islands, among which the currents and eddies are very strong, and there are several difficult rapids; all, however, passable down-stream with rowing. With short intervals of smooth water, the river continues of this character for many leagues. Nearly opposite the mouth of the Igarapé Pary, I saw gorgulha* along the left bank for several hundred yards: some years ago Senhor Benedicto washed several pans of this gorgulha, and found gold and the different pebbles that mark the diamond formation, but did not excavate deep enough to reach the cascalha. Here one begins to see the assai-palm and the large chesnut-tree which bears the Brazil-nuts; along with these, too, commences what the boatmen well call the "plague of piuns," a small fly but a great torment; when taking observations in the daytime, I have often been obliged to get some one to fan me. Some 10 miles above the River de Peixes there is a good deal of granite along the river, and many immense lumps in the middle, some not covered even by the highest floods: the ground, however, on each side is not hilly. Below, the river is

* Gorgulha is a formation very commonly found overlying the cascalha, with a layer of earth between the two: it generally contains a great deal of broken quartz, and but few diamonds. Near Diamantina, in Minas Geraes, it was often thought worth washing; but near Diamantino, in Matto Grosso, very rarely.

smooth and still, but seldom in one channel, owing to a succession of islands, mostly large; one of them 5 or 6 miles long, and of considerable width.

The River de Peixes is the largest tributary of the Arinos, its mouth being fully 100 yards wide, and the Arinos at this point 200 to 250 yards. This river has never been explored: many years ago, one Padre Lopes went a short distance up it in search of the Martyrios, an El Dorado much believed in by Cuyabanos, though on very slight evidence; but owing to attacks of Indians and desertions of his slaves, he soon turned back. A ledge of rocks only a few yards wide runs across from the mouth of the River de Peixes to the left bank of the Arinos, though in several places completely broken through by the force of the current; it was, however, now scarcely above water, so that one could see but little of its nature. There are sundry ridges of hills hereabouts, but only 300 or 400 feet high; though, owing to the flatness of the country above, they had been in sight for many hours.

About halfway from the River de Peixes to the River Juruena, the river again becomes streamy, and there are two or three rapids; at the last of these, the only one on the Arinos at which even upstream canoes have to unload, the river is very wide and shallow; but below narrows again to 350 yards or less, where clear of islands: the islands, however, are large, and for many miles at a time divide the river into two distinct channels. The Arinos falls into the Juruena with a width of 300 yards; the latter being fully 500 yards wide, and the united river a little below not less than half a mile: but is so studded with small islands and divided by large ones, that hereabouts one can seldom see its whole width at once. The right bank is considered uninhabitable on account of the large ants (*traquás*), and Indians are never seen here. Some 6 leagues below the mouth of the Arinos, the Juruena passes over an immense undulating bed of granite, which often rises above water in smooth, shelving masses, here called "*lages*," and thus forms the heads of many islands: there are several rapids here, one very long and intricate; but the rapids of the Juruena below being so much greater than those of the Arinos, these have no distinctive names, and are scarcely even treated as *caxoeiras*.* In the woods here the most noticeable tree is the *masaranduba* ("milk-tree"—Wallace), a tree, I think, not found on the Arinos, for one could hardly fail to notice it, the withered leaves at this time being just the colour of young pomegranate-leaves: lower

* On these rivers the term "*caxoeira*" is equivalent to "*rapid*," a fall being invariably treated as "*salto*;" a distinction not made in all parts of Brazil, as on the river São Francisco the great falls of Paulo Afonso, and many small rapids above, are alike termed *caxoeiras*.

down it was so numerous and so bare of leaves as to give the woods quite a wintry appearance. The seringueira—the India-rubber tree—begins to show itself, but the trees are not of the size found below: also the embira-tree, the inner bark of which is used for ropes to take the canoes through the rapids.

Below the lages just mentioned, the river continues smooth and with no great current till near the Apiacar villages, above which it is full of little islands and rocks, with many small rapids. The Apiacares are a small tribe, and the first one meets with that understand the Lingoa Geral: it is said that a larger portion of the tribe, not wishing to hold intercourse with the whites, broke off and settled on the Rio S. Manoel. They have about half-a-dozen villages, all on the water-side, and generally showing a good deal of taste both in the positions and in the way the wood has been cleared or left standing; the houses are very neatly walled, and thatched with pindorval-leaves, but inside all is dark and dirty, and hammocks are hung from post to post in every possible direction. Neither men nor women wear any clothing whatever: they besmear themselves with a mixture of urucú and palm-oil, which serves to colour them and to kill the “pinus.” In appearance the men are very superior to the women, and some of the younger ones handsome; they wear their hair short. Around the houses are plantations of urucú, cotton, sugar-cane, mandioca, bananas, corn, and sweet potatoes; the cultivation being at least as good as one sees anywhere in the interior of Brazil. Cotton they use only for fishing-lines and for their hammocks: in one of the houses I saw a rude sort of loom. The men occasionally work in canoes bound up-stream, but very seldom in those bound down, as they are lazy and dislike the hard work in the rapids. Salsa-parilha is the only object of trade they have to sell, and they seem to have learnt its value; anything else may be bought for a few fishing-hooks.

About 5 miles below these villages, at the mouth of the River São João de Barra, is the caxoeira of the same name, the first of the great rapids and one of the worst. There are two channels separated by a small island: I went down the left channel, not more than 50 to 60 yards wide: the current runs 10 or 12 miles an hour, with great depth and high breakers. The right channel is somewhat wider, but is considered worse; the water, however, seems to divide pretty equally, passing as through a double gateway into a large calm lake below, a mile or so wide and 2 to 3 miles long. All cargo is unloaded, and in high water up-stream canoes have also to be taken overland. Passing another caxoeira less difficult, one reaches the Salto Augusto—the great fall. By keeping close in shore along the right bank, a canoe may safely come within 60 or 70 yards of the fall; thence canoes and all

have to pass overland for about 650 yards. The rock is a sort of flagstone, with very level strata. The river has two channels: the fall on the left is perhaps the higher, but the main body of water passes on the right, with a width of 100 yards, narrowing to 80 yards or less below. The immediate fall is about 30 feet, with a second smaller one 150 yards below; and the river at this time being full, the rush of water from one to the other was very fine. This fall is considered the boundary of the provinces of Pará and Matto Grosso, and to some extent it is a natural boundary: above, the fish are mostly scale-fish; below, mostly skin-fish. The woods also become more productive, and the Apiacares say they do not find *salsa-parilha* above the fall.*

Between the Salto Augusto and the Salto de S. Simão there are 14 caxoeiras: of these, five at any rate when the river is full are easily passable without unloading; at the other nine, cargo has to be carried overland, oftener over than under 500 yards' distance. This is partly precautionary, partly to lighten the canoes, as in most of these rapids the main-channel is impassable, and the canoes are taken down side channels, with two or three men on board to keep the boat off the rocks with punt-poles, and the rest of the crew on shore with ropes to bow and stern; in this way four or five hours are often spent in passing a single caxoeira. The "*Misericórdia*," though passable rowing in as many minutes, is perhaps the most dangerous on the whole river, on account of the violent whirlpools which have sucked down canoe and all occasionally. The river here makes a sudden bend in and out at right angles, narrowing at the same time from considerable width into a channel not 70 yards wide, closed in by beds of rock; the

* *Rapids and Falls of the Jurueña.*

S. João de Barra.—Unload; carry cargo 200 yards.

S. Carlos.—Pass loaded.

Salto Augusto.

Tocarisal.—Unload; carry cargo 100 yards.

As Furnas.—Unload twice; 200 yards and 40 yards.

Salsal.—Pass loaded.

As Oudas.—A collection of small rapids among islands. Pass loaded.

S. Lucas.—Unload; about 600 yards.

Dobracão.—Pass loaded.

S. Gabriel.—Pass loaded down side channel: main channel half a mile wide, and shallow, with a fall of two or three feet.

S. Rafael.—Unload; 450 yards. River divided into about a dozen small channels by parallel islands.

S. Iria.—Unload; 500 yards. The guaraná-plant is found wild near S. Iria in some abundance.

Banco de S. Ursula and Canal de Inferno.—Unload twice; 600 yards and 200 yards. The Banco is almost a fall.

Misericórdia.—Unload; 200 yards.

S. Florencio.—Unload; 500 yards.

Labyrinth.—Pass loaded.

Salto de S. Simão.

Todos os Santos.—Pass loaded, except in very low water.

depth here seems great, and the current varies continually, the back-stream sometimes running strongly in the very middle.

S. Simão has a fall of about 6 feet, except in the middle of the main-channel, where the water has broken it down and made a rapid; the fall is preceded by a long rapid, and cargo has to be carried nearly half a mile. There is here a good deal of a soft white sandstone, pieces of which are generally carried off to serve as grindstones: the fall, however, seems to pass over rock very similar to that at the Salto Augusto. The difficulties of these caxoeiras may be estimated from the fact of our occupying six days in travelling from S. João de Barra to below S. Simão, a distance hardly over 60 miles; travelling down-stream, and with no other cargo than provisions and personal baggage. Some 3 miles below S. Simão is the Caxoeira de Todos os Santos, the last of the caxoeiras of the Juruena. Just below this the River S. Thomé (about 70 yards wide) enters on the right: on the left bank, opposite, is a small settlement of Mundrucús, who originally came here to work for two runaway slaves from Manaos; they all wore clothes, and understood Portuguese.

The stretch of river from this to below the S. Manoel is known as the Rio Morto; but at this time there was still a slight current. Somewhere here, though I cannot say precisely where, but certainly above the S. Manoel, the river-water changes from the clear dark green of the Arinos and Juruena above into a dull blackish tint; for which reason the river from the S. Manoel down is known as the River Preto; even at Santarem no one speaks of it by any other name. Possibly the colour of the bottom here may cause an apparent change; but below, the water is dark even over rock or white sand; a dull black, however, quite different from what Mr. Wallace describes on the River Negro.

The S. Manoel is 500 or 600 yards wide at its mouth, but seems wider a mile or two up; a little above the Juruena is half a mile wide, but at the point of junction is narrowed by an island. In most maps the S. Manoel is called River de Tres Barras, a name that seems founded on a mistake. I believe that the river has but one mouth; I travelled a good many leagues above and below, in broad daylight, and saw but one. Our pilot and others, who have made the voyage up and down more than 30 times, said they knew but of one; and the same was told me by a small party of India-rubber makers—the first we met with—in sight of the mouth. There is a large igarapé, called the Agoa-Pona, that falls into the Tapajos a little below: this, however, they assured me had no connexion with the S. Manoel, and there are ridges of hill between that make it unlikely. They had been up the igarapé five days' journey and two more by land to the Mundrucú villages on the Campinas, whence they brought their provisions. The S.

Manoel is a larger river than it appears in any map I have seen, and I believe comes from farther south. Formerly it was navigated by Cuyabanos, but afterwards abandoned for the Arinos and Juruena, the Indians on it being more hostile, and the caxociras worse, and consequently the navigation, though more direct, more difficult. Canoes then used to start eight days' journey from Cuyabá, which certainly would not give more than 2° difference of latitude, and therefore put the S. Manoel as navigable in lat. $13^{\circ} 30'$ s. A fazendeiro also told me that in 1858 he started with others from the neighbourhood of Diamantino—say $14^{\circ} 30'$ s,—to hunt up stray cattle, and in seven days' leisurely travelling they reached the S. Manoel, there 180 yards wide, but not more than breast-deep. What other information I could obtain seems also to place the sources of the S. Manoel about $13^{\circ} 30'$ s.

Here one seemed to pass from the dry season of the south into the Pará weather, and for many days I was unable to get a single observation; the night and morning being cloudy, and the afternoon a succession of thunder-storms with strong winds and occasional squalls from north by north-east. Some 4 leagues below the S. Manoel, the river becomes rocky and streamy at a place known as Pesqueiro (from the abundance of fish), but only for a short distance; below, for about a dozen leagues it is very calm and still, appearing as a succession of lakes. On the left, low ridges of hill run along the water, with here and there cliffs almost hidden by the wood. The shallow of Capoeiras, about 7 miles long, was now only perceptible from its faster current; but in low water, and with up-stream loaded canoes, is very troublesome. A little below is the Chacorão, another shallow, 4 or 5 miles long: in the lower part of this, the river is $1\frac{1}{2}$ miles wide, and one has to cross nearly straight from the right to the left bank; there are small rapids here, full of large stones and lumps of rock. At the foot of the Chacorão, on the left bank, is a village of Mundrucús, whose country extends from the S. Manoel to near the Amazon on the east of the Tapajós, though most of their villages along the river are on the left bank. They are the most powerful and warlike tribe of all these sertões, and at the same time the most honest and faithful, and very friendly towards white people. They extend a sort of protection over weak tribes of Índios mansos, and carry on perpetual war with Índios bravos; none, however, dare to invade their country. On their expeditions they carry off the children of their enemies, whom they bring up and marry with their own people, thus materially increasing their own tribe: those who resist or try to escape, they kill. In one of their houses here I saw the head of a boy, of about 12 years old, who had been killed a short time previously; for it is the custom to carry off the heads and dress them up with paint and feathers. The Mundrucús are said

to indulge in cannibalism occasionally: this I have been assured by several persons well acquainted with the villages in the interior. The men wear their hair short, and all the fore-part of the head nearly bare; the face blackened all over, and the whole body tattooed in a check-pattern of black stripes. The women are better looking than the Apiacar women—no great praise. Neither sex wear clothing of any kind. The people here trade in salsa, and sell provisions to the parties of India-rubber makers. They fish chiefly with bow and arrow, and set little store by fishing-hooks.

The river below the Chacorão is smooth and wide, and generally in one channel; with very little current and long reaches—one fully 15 miles, due east by compass: indeed all this part is remarkably straight, and with very slight deviations from its general direction. Here we passed several parties of India-rubber makers; and in September, when the sand-banks are uncovered, a good many canoes come up for turtle and turtles' eggs. A little above the River das Tropas, considered the largest tributary after the Arinos and S. Manoel, the river passes through straits only 350 yards wide, but widens again directly. A few miles below we passed some small lages of a coarse red granite, and below this a very long reach, 15 or 20 miles, north-east. In this and between it and the River Creporé are two shallows, but now with plenty of water.

The River Creporé enters on the right with a width of about 70 yards: it is one of the various streams leading to the Mundrucú villages on the Campinas, the higher country dividing the Tapajos and Xingú or Xuigá waters, and said to be of exactly the same description as the campos of the south. I suppose, therefore, that in this latitude the virgin wood extends only a certain distance from the river: 3 or 4 miles below the River Creporé, on the left bank, is the Hill of Cataquara, several hundred feet high, of red calcareous rock here and there breaking into cliffs, and said to be cavernous. At the shallow of Mangabal Grande, 8 or 10 miles long, the whole river-bed is granite, with many smooth lages above water, and numerous small islands: the width varies here from 1 to 2 miles; the steering is very difficult on account of the shallow water, but the rock being all smooth there is no risk. The hills on each side are of some height, and here and there the hill-tops are open campo. A little below the Mangabal are two or three Mundrucú villages on the left bank, and the last on that side, as the Maué country begins soon below. There is still for many miles a good deal of granite in the river, but in large lumps rising out of deep water. Some 6 or 8 miles below, the river seems barred by a serra in front, and makes a bend in and out at right angles, for about its own width; just in the bend is the island Montanha, a hill about 200 feet high, and the only island of any height in the

whole river. Below this, on the left bank, are the houses of several Maués, who have broken off from their tribe, and settled as farmers on the river-bank; the villages are all in the interior. The Maués are the best-looking Indians I have seen, and by far the lightest in complexion. The traders say they are a very clever but a false and dishonest set of Indians; I should remark that among the Parexis, Apiacares, and Mundrucús, I have seen nothing of that tendency to pilfering which is such an annoyance to any one traveling among North American Indians. Below are the Feixos, where ridges on each side narrow the river to a short 180 yards; and below this, in the time of the Pará revolution, there was a good-sized settlement of the rebels, but no trace of it now remains.

As it approaches the lower rapids the river becomes very streamy and splits into a good many channels. There are four of these caxoeiras; the two first, the Apué and Cuatá, are the most tiresome, as the cargo has to be carried overland nearly half-a-mile at each: the canoes pass down narrow, rocky side-channels, in which ours received a good deal of damage. On an island in the Cuatá there has been some little gold-mining, and diamonds also are said to have been found. I picked up several "cattivos" and "cabroxos," the chief pebbles that mark the diamond formation. Maranhão Grande, the third caxoeira, is a good deal like that of S. João de Barra, and is considered one of the most dangerous on the whole river. Maranhão-sinho, the last of these rapids, all of which are close together, is passable without much difficulty, having great depth and very little wave, but strong eddies. These rapids, barring the free navigation of the river, have been a limit to white settlers, whose houses begin almost within sight of them. Some 6 leagues below, on the left bank, is Itaituba, the first town and the chief port of trade with Cuyabanos; before the Paraguay was opened to Brazilians, there was a good deal of trade for salt and iron, several monsoês (fleets of 10 or 15 canoes) coming down every year. These monsoês were mostly of ubás, the canoes made of a single trunk, which carry more cargo than igarités, but are heavier and less manageable: people call six months a fair up-stream voyage for a monção, and 80 days for an igarité, though the voyage has been made in 50 days. The best season for the up-voyage is a matter of much difference of opinion. Now there is no trade except for guaraná, for which some half-dozen igarités start from above about November, as the new guaraná is ready in January, and arrive again about the end of April. In the province of Matto Grosso guaraná has become as much a necessary of life as coffee in the East, and in the greater part of Brazil; the price at Itaituba was 1 mil-reis a lb.; but owing to the difficulties of the voyage, a good deal gets broken or spoilt, and 7 or 8 mil-reis a lb. is no uncommon price in Cuyabá.

As the river from Itaituba down is probably well known, it is not worth saying much: below Aveiro it widens exceedingly, being not less than 8 miles, and in parts, perhaps, 10 or 12 miles from bank to bank, till near Santarem, where it narrows again. There was no perceptible stream here, though the river was still high; and as there is generally a strong up-stream-wind all day, the smacks that navigate this part of the river often make their up-voyage in as many days as they spend weeks in coming down.

The distances by water may be about the following:

	English Miles.		English Miles.
Porto Velho .. .. .	..	Brought forward	625
Mouth of River Sumidoro ..	80	River S. Thomé to River	}
Tapanhonas ..	120	S. Manoel	
Head of rapids of River Arinos	100	First Maudrué village ..	80
Mouth of River Arinos	120	Mouth of River Creporé ..	100
Salto Augusto	140	Caxoeiro de Apuê	120
Mouth of River S. Thomé ..	65	Itaituba	25
		Santarem	170
Carry forward	625	Total	1200

The Tapajos and its tributaries are not considered to possess either great abundance or great variety of fish: the following are those we caught. Above the Salto Augusto—the matrinchão, scale-fish; much like a roach in appearance, but cuts pink, and tastes like a sea-trout; seldom over 7 lbs. Robafo—scale-fish; looks much like a barbel, but without feelers, and has a slight tinge of copper-colour; largest I saw 15 lbs., said to run up to 20 lbs. The small alligator and the cagado or small turtle are very numerous here. I have been told that when the Arinos is low, the anaconda (sucuri or sucurojú) is often seen among the stones of the rapids; we saw none. Below the Salto—pescada, dog-fish, piranha—scale-fish; the first two, bright silvery fish, and frequent sharp waters, not found in many places; pescada, hog-backed, seldom passes 6 lbs.; dog-fish runs up to 10 or 12 lbs., looks much like a grilse, but with finer scales and good holders, whence its name; iranha, a small fish, shaped like a tench, but silvery, goes in schools, very voracious; in fishing for it one makes plenty of splash. On some of the rivers of Maranhão it is unsafe to bathe, on account of the piranhas, as they fix on a person as herrings are said to do. Skin-fish—jáú, jundia, pirarara, pirahivas (the pirarucu is only found low down on the Tapajos: we never caught one). These fish are all shaped a good deal like a codfish, large-headed, round-backed, and flat-bellied; they all have long feelers, eyes exceedingly small, and placed quite in the top of the head; teeth also quite small. The jáú is the shortest and stoutest

built; back of a mottled green, with dark spots. The pirarara is longer and leaner; the white of the belly extends halfway up the side into a streak of yellow, ending in a dull red towards the tail. The pirahiva is the best built, having rather a mackerel tail: this fish is said to grow to 60 lbs.; largest I saw, 32 lbs. Below S. Thomé the large turtle is abundant; the large alligator is found, but rare; I saw none till below Itaituba. Otters one sees more or less on the whole river.

The tapirs abound along these rivers, especially along the Arinos: wild pigs also; those on the Juruena are mostly "queixados," and show fight. Onças, deer, and the game found in other parts of Brazil, are, the Indians say no doubt truly, found here; but I did not happen to see them. The jacú, mutum, and cabeça-sêca are the chief birds of game; ducks one sees now and then, but not in great numbers. On the Arinos and Tapajos the blue and yellow macaw abounds; along the Juruena, the blue and crimson macaw. I have never seen the two kinds together.

XIX.—*Narrative of a Journey through the Interior of Japan, from Nagasaki to Yeddo, in 1861.* By Sir RUTHERFORD ALCOCK, K.C.B., F.R.G.S.

Read, June 16, 1862.

A PAPER was read in this Society last season, giving some account of a journey in the interior of Japan, which was undertaken for the ascent of the mountain of Fusi-yama, and with the further purpose of visiting the sulphur-springs of Atami. I had intended giving an equally detailed narrative of the incidents and principal objects of general and scientific interest which came under my notice during a much more extended exploration of the interior of the country, in a journey I undertook last year, about this time, from Nagasaki to Yeddo, across the island of Kiusiu, through the inland sea to Hiogo and Osaka, the great commercial emporium of the empire, and thence overland to Yeddo, the capital of the Tycoon. I have unfortunately, however, arrived in England much too late in the season to give effect to this purpose now; and I owe, indeed, to the obliging courtesy of the President and Council the opportunity of presenting to the Society even the very brief and imperfect sketch for which I must now beg the indulgence of all who are willing to listen to it. Fortunately in my previous paper I gave such details of the general features of the country—the usual incidents of travel in Japan, and the social state and physical geography of the districts then traversed—that to those who were present, or who may since have read it in the 'Transac-

COREA

JAPAN

Reduced from a Japanese
Map.

YESSO

MATSUMAI

Hakodadi



tions' of the Society, any repetition of such details would be superfluous, and they will be prepared, without further preface, to take their place in the motley caravan which formed my cortège on the 1st of June last year, and start at once from the semi-Dutch colony of Decima, in the bay of Nagasaki. It was such a morning as we have frequently in this pleasant climate of England, even in June! It began with a chilling drizzle, which soon deepened into a heavy drenching rain. The wet season of Japan had, in fact, commenced, beginning as it does with tolerable regularity about the end of May, and extending into July. When it does not rain, in this season, the sun shines out with scorching power. I had thus a pleasant prospect before me of a thirty days' journey on horseback, either under a drenching rain or a tropical sun; for, although Japan has no pretensions geographically to a place in the tropics, during the summer months it asserts a claim to take rank with the best of the Spice Islands, both by its luxuriant vegetation and the power of the sun; and this so effectively and perseveringly, that no traveller will feel disposed to contest the point. Were any evidence wanted, Japan would furnish another conclusive example that latitude only forms one element in the determining causes of heat and cold and of climate generally. In this little group of islands at the other side of the globe, often compared to Great Britain and Ireland from their size, distribution, and geographical position, the northern island of Yezo, in which our consular port of Hakodadi is situated, has a Siberian winter, where the inhabitants are snowed up several feet deep for many months; while at the capital of Yeddo, corresponding to London, in the larger island, south, snow never lies above a day or two, and during October, November, and December, and often January, there is only an Italian winter in the most favoured portions of that favoured land. A bright sun, a clear atmosphere, and sky of the purest blue, without a fleck or a cloud, sometimes for weeks together, are all to be counted upon. The trees put on their richest tints of every shade and hue, from the deep green of the camellia to the bright scarlet of the maple and the russet brown of the beech: these intermingled with a hundred varieties of evergreens, flowering shrubs, and forest-trees, of which the evergreen oak is one of the noblest as well as the most common. Nature has indeed lavished her wealth on the soil and vegetation—on all the physical features of Japan—and given an Italian sky and temperature with an eastern sun to enhance the beauty of all her other gifts. Unfortunately she seems to have exhausted her generosity when she made this terrestrial garden, and to have forgotten the children that were to live in it—some to till the ground and others to govern it—for one is often tempted to quote Byron's line descriptive of another Eastern land, where all, "save the spirit of man, is divine." But in our impatience at a perpetual menace

of violence, which all of Western race must live under for many long years to come, I fear, we are apt to do injustice to the great virtues of the mass of the population. They not only are the most patient, untiring, and successful cultivators of the soil, but they are also a frugal, contented, and good-humoured race—docile and long-suffering, and to all appearance the easiest to govern and make happy of any it has been my fate to live among. They are, with all this, among the most ingenious and enterprising of Eastern races in all industrial pursuits; and I firmly believe, if they had fair play, could hold their own against either Birmingham or Manchester, Paris or Lyons, in many of the manufactures for which these centres of trade are noted.

As regards our relations and commercial interchange of products with the nation, however, all this is to a great degree neutralized and counterbalanced by one element in their institutions, and that is FEUDALISM. The iron hand of a proud, astute, and relentless class of feudal chiefs weighs heavily upon all the energies of the people. Proprietors of all the soil, exercising feudal sway with feudal privileges of life and death over all below them as their born thralls and subjects, they leave to the cultivators no more than is sufficient for a bare subsistence, and reduce the life of the mass to a mere animal existence. What Great Britain and France were in the times of the Crusades—what Venice was in the palmy days of its power, under a jealous and ruthless oligarchy, with its phantom sceptre in the hands of a powerless doge, ruled and coerced by a secret Council of Ten—Japan now is, in all that concerns its privileged classes, its feudal nobles and their armed retainers, all ready to do battle, and to kill or be killed, with equal promptitude at the beck and call of their chiefs. These are the classes that consume all the surplus wealth and produce of the soil. To maintain these idle and dangerous classes in their haughty privileges and unapproachable superiority, some thirty millions of the most industrious race on earth, perhaps, toil and spin, dig and delve, in the fairest land of the East. And for the last three hundred years, ever since the expulsion of the foreigners and the destruction of every trace of the foreign imported Christianity under Taico Sama and his usurping and still more implacable successor Gongen Sama (the two most revered and glorified Tycoons of their history), this state of things seems to have been steadily maintained, and what is perhaps still more remarkable, maintained without civil feuds between the Daimios, insurrection against the sovereign executive vested in the Tycoons, or murmur among the oppressed masses, which, though politically dead, are yet like the busy inhabitants of a vast ant-hill, ever in movement, ever toiling, and seemingly within the limited range of a very material civilization, ever enjoying life, without a thought for the past or a care for the future. And yet with such

a people, enterprising in all that lies within their field of exertion or vision, careless of life, proud of their nationality, with a warlike and belligerent class to head them, if once there were a cry to arms or revolt, who can say what a day or a year might bring forth, now that a new element is being infused into their national life?

I believe we have here the key to all our difficulties, the true source of all our dangers, in dealing with this people and their rulers, and the solution of any problem the policy of the latter may present, in first making treaties with the great Powers of the West, and then exhausting every device, from chicanery and subterfuge, to menace and massacre, in order to retard or prevent their due execution. They feel that their country is volcanic in a moral as well as a physical sense; and as we never lie down to sleep in Yeddo without a consciousness that our waking may be in the midst of some frightful cataclysm which may involve every one in a common ruin—the earth yawning beneath our feet, and houses falling over our heads—a catastrophe that has befallen the capital and other cities many times already in their history; so do the Daimios feel that they are sleeping in the midst of perpetual danger—that their power is being undermined, and the foreigner holds the match that may at any moment be applied to their destruction. They are led to this conclusion by a sort of national instinct, shared with all their armed retainers and most of the officers and privileged adherents to the existing government, and also by the light of such reason and intelligence as they possess, further helped by certain gleanings, gathered through the Dutch, of European nations and their history. And they fear and hate us with all the implacable hostility of which we can fancy a Gaston de Fox or a Hotspur capable when threatened with an uprising of the burghers and peasants, or a Jacquerie. Can we wonder at it? Is it not, on the contrary, at once natural and inevitable? As I said in my last paper, the infiltration of European ideas, principles, and motives of action, as well as habits of thought, which are felt to be antagonistic to the existing order of things, and subversive of all that has been and is, point to a consummation, sooner or later, which is not, in their opinion, desirable, and, so far as in them lies, they will oppose it, and some to the death, if need be. “Better die with the sword in our hands,” exclaimed the Prince of Kanga, one of the most puissant of the Daimios, in a great Council, when the first treaty was under discussion—“better die fighting than depart from our ancient traditions, and let in the foreigners!” Perhaps it had been better if such had been the unanimous voice of his class; for then, I think, it may safely be affirmed there never would have been (in our day, that is) a treaty for establishing political and commercial relations with a country so ill-prepared, by their political institutions and the character of their ruling

classes, for any amicable relations with Western Powers. Certain it is the first treaty would not in that case have been made by our friends on the other side of the Atlantic, since recourse to actual violence to extort a commercial treaty was not more repugnant to their avowed principles of policy than to their habitual course in the East. But this is not the place, were there more time, to discuss the policy or the justice of European Powers forcing themselves, their commerce, and their relations upon a people who desire to maintain their isolation—who possess everything within their own limits which they wish for, and must first learn *new* wants before we can find anything to supply. I have only thus hastily and slightly touched upon the whole subject, because it will explain why I undertook a fatiguing, and as the Government, through their officials, assured me (apparently, it would seem, with some reason), a dangerous journey. As to the danger, I had lived so long under a continued menace of assassination from those inimical to all foreign relations, that it did not seem to me worthy of much thought. Any representation the officials had to make was like a twice-told tale which no one is expected to believe. After carrying one's life in one's hand, as it were, from day to day, a time comes when all thought about it not only becomes wearisome, but must be dismissed, or daily existence would itself become intolerable.

Japan, as I once wrote to Her Majesty's Secretary of State for Foreign Affairs, was not a country I could recommend just at present for a nervous man. Fires every night destroying whole streets or quarters of a vast city; earthquakes in every week, with an aggravating uncertainty as to the time of occurrence, the duration, or the extent of the shocks—a perpetual threat, every now and then enforced by an assassination or an attempt at a more general massacre of foreigners, and occasionally of their own ministers, if supposed to be favourable to foreign relations—being the general conditions of life in Yeddo. And I may be allowed to say they are not the pleasantest in the world, nor altogether satisfactory in any respect. Such as they were, however, I had to make the best of them, not only for myself but for others. The time was approaching for the opening of new ports for commerce and the residence of foreigners, more especially Hiogo and Osaka on the inland sea of Suonada—ports which the Government of the Tycoon were evincing the most anxious desire to defer the opening of; and it was very essential that I should, in the exercise of a treaty right, as the British Minister, to travel freely through the empire, have personal means of observation. It was necessary that I should satisfy myself, not only as to the real value of these ports, but of the state of feeling of the people there and throughout the country generally, as well as the actual relations existing between the mass of the population and the ruling classes. I say it was

necessary, for these were data which constituted the very elements of any sound judgment as to the policy or expediency of the only two courses open to Western Powers—namely, either to insist on the full execution of the treaties in all their stipulations, regardless of any consequences to the Government of the country—or, in other words, disregarding and disbelieving all their predictions of disaster and revolution as the inevitable result; or secondly, with or without certain conditions or equivalents, to accede to the proposal of the Tycoon and his Council of Ministers to defer the opening of the remaining two ports and two cities for a definite period of five years. I had to give an opinion on this important question; and, before giving it, I was determined to seek the means of forming it on data collected in a larger and freer field than the capital afforded, and by my own personal observation, since I could place implicit trust in nothing that came from Japanese sources. Satisfied this was the right course to follow, I made my arrangements in accord with my excellent colleague, M. de Wit, the Dutch Consul-General, who also desired, following the track of his predecessors the Dutch Commissioners from ancient times, to make the journey from Nagasaki to Yeddo overland. And on the 1st of June, nothing heeding the persistent remonstrances of the Governor of Nagasaki against the imprudence of our venturing on the highways beset by Lonins and enemies to the peace (as he had by especial desire ascertained), nor even the lachrymose state of the weather, which, however, was more sensibly felt, our cavalcade of some fifty or sixty persons began the journey. They consisted of our own party of five Europeans, an escort of Japanese officials with their officers and servants, with baggage-horses, norimons, and porters, the inevitable *impedimenta* and accompaniments of a long journey in Japan. We first threaded our way through the stone-paved but sloppy streets of Nagasaki, and gained the high road. The route lies across the north-western angle of the southern island of Kiusiu, to the fortified town of Kokura, at the entrance of the sea of Suonada, stretching for miles between the mainland of Nippon (the name the Japanese adopt when speaking of the empire) and the island of Sikopf. This part of the journey occupied nine days, travelling at the rate of 8 re, or something less than twenty-four miles each day. During this part of the journey M. de Wit and myself had been persuaded to trust to the cattle we should find on the way as post-horses—a mistake no one will ever make twice. Whether it was the malice or idleness of our officials, or that only the most wretched beasts could be found for hire, may admit of some doubt. I am inclined to think, however, there was a little of both. The officials were not grieved—they would not have been Japanese if they had been—to see foreigners of rank cut the sorry figures we all did

on the backs of packhorses; animals reminding one of Bulwer's description of a Welsh pony, "a little blind, lame of one leg, and broken-winded, but an exemplary ambler withal." Only they had not even this virtue, and certainly every vice common to the equine race. This was our one great misery, and I confess to have chafed under it, remembering that I had left a good horse behind me, under bad advice. As for the weather, it rained most days, more or less; and the mountain-roads, especially down in the valleys, became at times all but impassable. But not even these untoward conditions, serious as they were, could rob the country of its picturesque features of continually alternating hill and dale, mountain and valley; the former often terraced to the very summit, though the sterile sandstone might constantly be seen cropping up, as if protesting against the continued miracle of patient husbandry which could draw verdure and food from such a soil. Indeed so constant is this sandstone formation, that the fields below seemed little else than sand, and every river we crossed was choked up with sand washed down from the adjoining hills: rivers of which it might be said with truth that they were chiefly remarkable for the absence of water. In 300 miles, all the way to Yeddo, we only came upon two rivers navigable for boats, and one alone for junks—that on the banks of which Osaka is situated. Yet by dint of patient toil and incessant irrigation even Kiusiu, which in most countries would be a desert, is made a fruitful land. The wheat-harvest was in progress, but how in the midst of so much rain—in the wet season indeed—the Japanese farmer manages to cut and house his corn, is a problem I have never been able to solve. They do not pile it up in sheaves as we do on the ground, but hang the sheaves on horizontal pegs fixed to stakes scattered over the fields for that purpose. The rice-harvest is in November, and, fortunately, under happier circumstances, as rice is the great staple of food, and a bad harvest of this cereal is a national calamity: whereas wheat is grown in much smaller quantity, and is rather a luxury than a necessity. It is chiefly used for little cakes, or as vermicelli, and mingled with beans in a sort of soft dough.

In June, green plots of the brightest hue indicate where the seed-rice is sown, and the transplanting process was in many places going on, while in others the peasant, with a light ploughshare, sometimes with a harrow, and a bullock or a pony, was busily engaged breaking up the ground in preparation, and with the water let in, was to all appearance reducing the soil to a state of liquid mud and manure.

The Aram, a sort of lotus-plant, with an edible root, the sweet potato, bearded wheat, and a bean, from which they make the best soy in the East, furnished the chief crops. A few patches of tea, occasionally a cotton-field, or a home-plot of tobacco, and,

more rarely, a few poppies here and there appeared. The variety of timber and foliage is great. The pines and the vegetable wax-tree preponderate perhaps, but these are everywhere intermingled with the *Cryptomeria Japonica*, the bamboo, and the palm-tree, thus blending the vegetation of the temperate and tropic zones in a way I have never observed elsewhere. The hedge-rows are mainly composed of evergreens, the Yew, the Camellia, and the Gardenia, growing wild. They are generally kept carefully clipped; and from the Japanese there is little doubt the Dutch borrowed and introduced into Europe the fashion of clipped trees and hedges, which go to this day by the name of Dutch gardens. I do not know whether Macadam went to Japan for the idea of his macadamized roads, or our American cousins for their knickerbockers, but I can confidently affirm all these things were old in Japan three hundred years ago.

On the third day at Urisino in the morning, and Takiwo in the evening, we found hot sulphur-springs, in much request among the natives for bathing. The first, which we reached at mid-day, was open to the street, with a mat-roof only to keep off the sun. As we approached, an elderly dame stepped out on to the margin, leaving half-a-dozen of the other sex behind to continue their bathing. The freedom of the matron from all self-consciousness or embarrassment was so perfect, that the charitable exclamation of John Huss, as he saw a pious old woman hastening to bring a faggot to his stake, seemed perfectly applicable—"O Sancta Simplicitas!"—O sainted simplicity, and happy matron! with no fear of a censorious world, vexed by no arbitrary code of conventional proprieties, and feeling no shame in the absence of covering. She had washed and was clean, and with the consciousness alone that a duty had been fulfilled, she evidently saw no reason why all the world should not know, and see it too, if they chanced to come that way.

During this journey through Kiusiu the richness and fertility of the land, so far as agricultural produce was concerned, presented a strange contrast with the obvious poverty of those who tilled the ground and lived upon it. Even in the large towns, though better houses were to be seen than in the villages or hamlets, there was still no sign of commercial activity or prosperity. I was, indeed, struck by the fact throughout the whole journey, that only where trade existed was there any material evidence of activity or wealth.

Of the exact conditions of the tenure of land I have no reliable information, though it has been with me a constant subject of interest and inquiry. The rent exacted, according to different accounts, varies from two to four fifths. Whatever may be the proportion, I think I saw conclusive evidence that nothing beyond the barest subsistence is left to the cultivator. Absolute destitution

in Japan seems rare, and the very beggars have rather a nonchalant and jovial air, as though begging were rather an amusement than a necessity; but accumulated wealth in the hands of the burgher class would seem to be quite as rare.

On the third day of our journey, when near Takiwa, we came upon some coal-mines of the Prince of Fizen's. They were close to the high road; but a bamboo fence and a couple of armed retainers behind it had been placed on the cross-road leading to it, evidently to prevent our intrusion. Disputing the right of any Daimio thus to restrict a Foreign Minister to the high road, I swung myself over the side and walked deliberately towards the coal-pit, amidst a huge clamour of the guard, soon reinforced by others. They endeavoured, indeed, to arrest my course by every means short of actual violence, and seemed more than once disposed to proceed to the last extremity. There was a treaty-right at stake, however, of no mean importance, and I did not feel at liberty to yield, so held on my way, followed at some distance by M. de Wit and my own people. The coals appeared of fair quality and bituminous, but exposed in heaps to the air, and liable to rapid deterioration. The mine itself was apparently worked in a very primitive fashion by horizontal adits. The same difficulty occurred a few hours later, when I turned off the high road but a few steps to examine a fine embankment for a reservoir, thus proving that, notwithstanding a distinct treaty-stipulation of free right to travel, the Daimios did not scruple to ignore all right of a Foreign Minister to leave the high road, and take a step in their territories to the right or the left. The treaty is to them a dead letter, in this as in all other things, when opposed to their politics or their prejudices.

Arrived at Kokura, the fortified capital of Bouzen, and one of the keys to the straits between the two islands of Kinsin and Nipon, we embarked for Simonosaki on the opposite shore, where H.M.S. *Ringdove* was waiting to convey me to Hiogo at the other end of the Suonada Sea. Simonosaki is a long straggling town, winding along the bay for a mile or more under the hills, which rise, at least, 1000 feet above. It is only a dépôt for native produce and foreign goods; the first to be sent on to Nagasaki and other points; the other for distribution inland.

I must not stop to dilate on the beauties of the inland sea. The scenery is really very fine, though I think it has been somewhat overrated by the few casual visitors. This Sea of Suonada is studded over with islands; its shores are evidently volcanic; and many perfect cones may be seen in the ranges of hills, though none appear in a state of activity. The villages on the shores are but fishing-hamlets of the most miserable kind; the sea itself is, however, the highway of a great traffic. Admiral Hope, in the

two days occupied in traversing its length, had the junks passing him counted, and they amounted to more than 1500.

On arriving at Hiogo we found Takimoto, a Governor of Foreign Affairs, waiting to receive M. de Wit and myself. He had been sent express by his Government to arrest our farther progress overland, and induce us to complete the journey by ship. The ground alleged was danger to us personally; but this failing in its effect, he was instructed to urge the importance to the Government, in a political point of view, of our abstaining from a visit to Miaco, the capital of the Mikado—a negotiation being nearly happily concluded for a marriage of conciliation between the Mikado's sister and the young Tycoon—in which foreigners would be great gainers. After two long interviews I and my colleague consented to waive our intention of visiting Miaco; but firmly refused to take ship, or otherwise change our course. The rest of the journey was accomplished much more satisfactorily to ourselves, if not to our Japanese friends. Two of my own horses having been despatched to meet me at Hiogo, I found them waiting my arrival fresh and in excellent condition. Hiogo is a town of some considerable size on the edge of the bay, and may be considered to some extent the shipping-port of the larger city and commercial capital of Japan, Osaka, which is situated in a valley some 30 miles distant. Through this valley a river runs, dividing into numerous branches and further connected by a multiplicity of canals. We proceeded there on the following day. Its immense area and the signs of material wealth and commercial activity exceeded my expectations. Even a cursory glance sufficed to satisfy me that Osaka, not Yeddo, was the great centre of commerce in Japan; and that Osaka and Hiogo, in a commercial point of view, would be more valuable to us than all the other ports put together. We were nearly an hour in traversing the vast suburbs on horseback, before we seemed to gain the great thoroughfares filled to overflowing with an immense but very orderly crowd. There was, indeed, much pushing and squeezing; and now and then a desperate raid on some luckless front rank was made by the police; and blows were furiously dealt on the shaven heads of the offenders. But the only weapon was a paper fan; and, although in their hands it proved a most efficient instrument, it not only broke no bones, but had the additional advantage, over our policeman's staff, of not even ruffling the temper. We came at last to the main branch of the river, spanned by a substantial timber-bridge of 300 feet. Not a trace of hostile feeling was anywhere to be seen among the people. Here, as might be seen at a glance, was a vast population with whom trade is the chief occupation; and at every step

I saw evidences of the greatest activity. Piled up near the bridge were glazed tiles and pipes for drains, and large earthen jars for coffins—the Japanese preferring to be buried as they sit, resting upon their heels. It seems to them, no doubt, more natural, and is decidedly more economical of space. Instead of the traditional six feet of earth, a Japanese can be buried in three; while, if he is poor, his body is reduced to ashes, and a homœopathic allowance of earth suffices for his grave. The Japanese have some strange superstition about either sleeping or being buried with their head to the north: my servant would on no account permit my bed to be laid down on the mats in a wrong direction; and the better to avoid mistakes, in all the honjens, or hostelrys, the points of the compass are distinctly marked on the ceiling of the principal apartment. I could not remain many days in Osaca; but long enough to perambulate it in all directions, and to pick up some interesting specimens of pottery very similar to Palissy and Majolica ware, and some good specimens of silk and tapestry for the Exhibition; but for which I had to pay a high price compared with the rates in Yeddo. The sun was very powerful, and the second day we took boat, a sort of gondola, by the aid of which we traversed the whole city in various directions, and with the same facility as we might at Venice. We visited the theatre, and I am only sorry time will not permit me to give any description of the dramatic performance as an illustration of Japanese life: strangely enough I found, after my return to Yeddo, that I had actually witnessed here a rehearsal, as it were, of the scene of violence and bloodshed in which I was so soon destined to be a chief actor in the attack on the Legation, by a band of armed ruffians, the second night after my arrival. Only, the scene in the play was laid in a hostelry on the road instead of the Legation. The play in Japan begins at ten in the morning, and goes on until six in the evening; the pit and some of the galleries are divided into boxes, into which family-parties distribute themselves, and have their lunch and dinner brought to them while the piece is going on. The main staple of most of the pieces, I believe, is fighting; and *Lonins* are often the heroes. This is interspersed with love-scenes, often of the grossest character; but on which, as I myself saw, mothers and daughters—maidens and matrons—all look with the greatest coolness and nonchalance: and fathers and husbands take them there. I merely mention the fact, for time will not permit me to draw any inferences. So of many other illustrations of character and incidents of our journey, I cannot even attempt to narrate them, however briefly, at this hour. I will only mention one curious circumstance which occurred on the fourth day after we left Osaca; because it is more than usually characteristic,

and throws great light on the kind and extent of power exercised by the Daimios within their own territories. A deviation had been made on the previous day from the pre-arranged programme of our halting-places for the night, under some futile pretext that there was no house of entertainment at Uieno fit for our reception. We slept, therefore, at a little town or village rather, a few miles short of it, and the next morning about ten o'clock, arriving at Uieno we found it a large town, the chief place of residence and capital of a Daimio. As we advanced through the streets we found every house and thoroughfare hermetically closed—not a whisper was to be heard, nor a head to be seen. The side streets were all barricaded, and shut out of view by curtains spread on high poles. His own house, which we passed, was similarly masked by curtains. What did this extraordinary proceeding mean? Even in the adjoining villages neither child nor woman was to be seen. Information from our officers was hopeless. A series of evasions and fabrications, each succeeding one more absurd than the other, was all that could be extracted from them. "It was, no doubt, an order of the Daimio Todo-idzu Minokami, Prince of Itse and Isan; but perhaps it was only the act of his officers." It might be a sign of profound respect—or it might also, as they were fain to confess when sorely pressed, be a mark of enmity. Such was the construction put upon it by our own servants, from whom the truth, so far as they knew it, was upon the whole more likely to be got. The mystery remains unsolved to this day. No similar reception awaited us elsewhere; but in *all* places where a Daimio had his principal residence, I observed we were jealously barricaded out of all but the main streets through which we must pass on our way. Once or twice it was noticed, and of course we were assured it was for our protection, and a proof of the anxiety to prevent all danger, or our being molested by crowds. Nothing in this world is more hopeless than to get the truth from a Japanese official. This system of jealous exclusion and the isolation of foreigners is a great evil, and we shall make no real progress until it ceases; but how this end is to be attained—and when we may hope to see any effective change—are questions full of difficulty, and which would carry us much too far if entered upon here. There are national customs, traditions, and long-cherished hostilities dating from the previous intercourse of the Portuguese and Spaniards, and a time of internecine war attributed to foreigners and their religion, to be contended against. I remember as M. de Wit and I were riding on the Tocado one day, far in advance of any of our escort and alone, at a sudden turn of the road we came upon a large cortége, evidently the retainers of one of the Great Daimios. His importance had indeed been marked for

several miles by the newly-swept and sanded road, and the small heaps of sand at regular intervals, in testimony that all due preparation had been made for a high personage. Seeing the head of the column advancing with spears and pennons, while the usual cry of *Sh'tanirio!*—Down on your knees!—came from the leading file, we fell into single file, and drew to one side of the road so as to leave ample space. No sooner, however, was it observed that we spontaneously made this move, than I saw the officer at the head assume a swaggering and blustering air, and gesticulate to the advance-guard behind him to spread over the whole road, so as to incommode us even at the extreme verge. And thus it ever is in the East: they who show willingness to yield and conciliate are in danger of being thrust into the kennel, and treated with contumely; while to resist with such people, is to bring on certain bloodshed. We read in the old chronicles, that the immediate cause of the persecution of the Christians, the final expulsion of all foreigners, and the extermination of those who had any relations with them, was the refusal of a Portuguese bishop to render proper obeisance to a prince whom he met on his way to Yeddo. But it has never been noticed that the proper salutation for any one of inferior rank in Japan, is to get out of a norimon or dismount if on horseback, and kneeling in the road to bend the head to the dust. We can hardly blame the Bishop for refusing this, or charge him with undue pride and haughtiness, though this has always been the stereotyped censure. Precisely that same offence is repeated every day, now in our present relations, that a foreigner passes a Japanese officer of any rank; and hence, I doubt not, no small portion of the rancour and hostility of the privileged classes. We are all so many Mordecais that will not bend the knee to Haman, or to the high and mighty nobles of the land. And for this there is unfortunately no remedy, but in the abatement of the inflated pretensions of the latter. What amount of courage and means of effective resistance to any European Power which might determine on the assertion of treaty-rights, they can command, is not probably very accurately estimated by those who are the readiest to bluster among the armed and privileged classes, and provoke a collision. It is so much in their habit rashly to fling themselves upon an enemy. I was detained more than a month in Japan, when I had fixed a time for my departure, by an occurrence well illustrating this feature of their national character. One morning as Ando Tsusimano Kami, the Minister of Foreign Affairs, was proceeding to the palace not a hundred paces scarcely from his own residence, surrounded by his own retinue of officers and armed retainers, a shot was fired at him, wounding one of his servants; and a party of only eight men

suddenly flung themselves, sword in hand, upon his norimon. Before any defence could be made he received a sword-thrust in the body and other wounds. The assailants were all slain on the spot, except two, one of whom badly wounded was taken prisoner; and the Ministers informed me that some of the attacking party, according to this man's account, were survivors of the attack on the Legation after my return from this journey. With men so ready for desperate enterprises, and so reckless of life, the policy to be pursued by Western Powers in the interest of commerce and of civilization must needs be a grave and an embarrassing question. Merchants, as is natural, are eager and impatient for the removal of all barriers and limitations—anxious for the immediate opening of more ports; but without very carefully counting the probable cost or the price to be paid. What if this could only be carried out, or indeed attempted, at the price of a social and political revolution in the country, an outbreak of violence and slaughter on the part of the armed classes, and the overthrow of the existing Government, with a subsequent state of chaos and chronic war such as now exists in China? Is there any Western Power with real interests at stake in the East, who would willingly accept the responsibility of measures of coercion to be followed by even a probability of such results? And if any could be found, who would be the gainers? Not the merchants assuredly, nor commerce—for, if it did not make all trade and residence in the empire impossible for half a century, it would at least put an end to both for the present; and it is not this country to whom such a policy could be acceptable. Any further Eastern complication, requiring squadrons and troops, and bringing all the horrors of war upon a well-disposed and unoffending population, could not fail to be unpopular to the last degree. And the Western Powers collectively appear to have arrived at the conclusion, that, bad as may be their prospects of rapidly overcoming the obstacles interposed by the ruling classes, there could be no advantage to commerce or civilization either, which would compensate—even if it could justify—the cost and the evils inseparable from a resort to force. And in the absence of this, merchants and statesmen alike must, I believe, learn to be content—take patience—and trust something to time and persevering efforts of a more peaceful character.

XX.—*Journal of Two Expeditions to the West Coast of the Middle Island of New Zealand in the Year 1859.* By JOHN ROCHFORD, Esq., of Nelson, Surveyor.

Communicated by Sir W. C. TREVELYAN, Bart., F.R.G.S., &c.

FIRST EXPEDITION.

IN accordance with arrangements entered into with the Provincial Government of Nelson for the survey of the West Coast district of that province, I started in the month of February, 1859, and, accompanied by three European assistants, proceeded in a small sailing-vessel to Port Cooper. Arrived there, my first object was to secure the services of Maories, to act as guides and assist in the operations of surveying, carrying provisions, &c.; but I was not able to induce a single native to join me, owing to their objection to explore country not then purchased from their race by the Government, and also because they did not like to face the danger to be encountered in passing through the snow on the dividing ranges. I therefore determined to start on the journey, aided only by three assistants (or "hands," as they are termed in colonial phrase) that had accompanied me from Nelson.

We proceeded first to Kaiapoi, and thence by a bridle-track to the stations of Mason and Taylor. This district is intersected with lakes, and in the middle of March we passed between Lake Taylor and Lake Katrine. Following along the margin of the latter (almost impassable through swamp), we had the difficult operation of ascending, with a pack-horse, some 500 feet of precipitous incline, in order to overcome an obstacle in our road; and then we reached the margin of Lake Sumner, the course of which leads into the valley of the Upper Hurunui, a valley some 15 miles in length, and consisting of a wide shingle-bed, studded with numerous well-grassed islands and flats, and forming the base of a range which is clothed with a forest of black birch. As we ascended towards the saddle of the Hurunui, we found that the river-bed became very contracted and rough; there were no further signs of grass, and travelling became almost impossible. At last, however, by scrambling up the sides of a waterfall, we reached the saddle, and found it to be covered with *nene* and the short rushes invariably discovered at the snow-line.

Whilst in this part I explored a hill to the northward, and discovered the source of the Tutai-kuri, which is a branch of the Ahaura running into the Grey.* On this hill I experienced one of

* The rivers Buller and Grey were explored some years back by Mr. Brunner, and an account was published in the 28th volume of this Journal.

Mr. Rochford promises the details of another survey, which he was about to undertake.—Ed.

NEW ZEALAND.

Routes near West Coast of

NELSON DISTRICT:

by
John Rochfort, Esq^r

in 1859.

English Miles
0 10 20 30

M^r Rochfort's 1st Trip is Coloured
2^d " 2^d " 3^d "

N E L S O N

WESTMORELAND

Note
M^r Rochfort's original tracing
does not contain all the places
referred to in his Journal. — L.

those atmospheric effects only seen to perfection at great altitudes, when, in a terrific storm, the clouds meet and rebound, the ceaseless peals of thunder become almost deafening, and the hail pelts down pitilessly on the exposed traveller. The hill was enveloped in a dense fog, which continued until daylight, when the rising of the sun presented a glorious contrast to the terrors of the night.

While at this elevation we suffered most cruelly from the attacks of innumerable rats; but, strange to say, although our canvas tents, clothes, and flour-bags, and other articles were greedily devoured, the rats would not touch the flour.

Crossing the saddle of the Hurunui, which is about a mile wide, we began the western river descent. For a short distance we travelled easily down the bed of the river, but we soon found it impracticable, owing to the precipitous falls over which the river cascades. We therefore crossed a spur on the north side, and going down a small creek we came to the river Taramakau, the course of which we followed for 3 miles through a gorge, scrambling over the rocks and wading through the water with much difficulty, as we had to carry our supplies, which then weighed over 1200 lbs. Birds are very scarce in this part.

Still following the course of the river, we found that about 14 miles below the saddle the water is augmented to a great extent, by receiving the contents of another river from the south (called by the natives Otira), and rendering the Taramakau difficult if not dangerous to ford. Much fine timber exists in this part of the country, and covers extensive flats which are available for agriculture.

While camped on this spot an accident occurred which greatly delayed my expedition and taxed our patience to the utmost, as we were then pushing on to unexplored and interesting land. One of my men accidentally shot himself in the arm, and it therefore became necessary for us to retrace our steps with him, and secure for the patient that quiet and assistance not to be had in my own camp. Leaving our tent, &c., to the care of the elements, we wended our way over the inhospitable region of snow, mountains, floods, and cataracts, to Taylor's station, where we left the wounded man. Here we met with Mr. Mackay and his brother, just arrived from the Haikoras, and, on my undertaking to be their guide, they agreed to accompany me to my former camp.

The weather now had changed, and we were detained by snow-storms for eight days at the Lake station; and on recrossing the dividing range we had to contend with snow breast-high and a four days' flood in the Upper Hurunui, which, as we had to carry fresh supplies of provisions, made this portion of our journey most trying. We, however, found a severer task awaiting us at the spur (previously alluded to), where, owing to the great depth of

snow, we had to tax every nerve to liberate ourselves. So arduous was the labour, that we had to take turns in going first, and occasionally one would sink half-buried between the yielding masses of snow, and would have to be extricated by the rest; at other times the leader, dislodging a large drift, would almost cover those in the rear.

After thus travelling for eight days, a walk of two more brought us to the scene of the accident, where I found that my stores had become all mouldy, and my tent was split to ribbons.

Here the Maories that had been engaged by the Messrs. Mackay came up, and proceeded on with those gentlemen towards the West Coast.

After repairing my tent I recommenced surveying. The river from this point, and 9 miles below, is a wide shingle-bed, covering the entire valley, and being divided by channels into numerous islands, covered with broom, tutu, koromika, akiaki, and patches of grass.

At the end of this the hills on the north side terminate suddenly, and form an opening of about 2 miles in width. Here much is to be observed. Looking from the Taramakau N.E., you see an isolated hill, called by the natives Kimonga, between which and the snowy ranges is a wide flat and an open pass to the Pohirua Lake, as far as the Ahaura River. The pass consists of open fern and flax, with patches of bush. Indeed, the hills may be said to end here, and that immense flat commences which claims the Buller as its northern boundary.

The rocks on the sides of the Taramakau are composed of argillaceous slate on one side and quartz on the other, giving favourable indications of gold.

Looking from the same place south-west by south, you see Mount Turiwhit , which appears to divide the valley of Taramakau: one pass running through to the Brunner or Kotukuwakaho, and the other carrying the water of the Taramakau to the ocean. The view from this point is beautiful in the extreme.

According to my instructions, I now left the Taramakau, and, cutting a line three-quarters of a mile long through a belt of white pine-bush, emerged on an open plain, very stony, and covered with high fern and flax. From this plain were two passes: the north-east one running between the isolated hill Kimonga and the main range, over the Pohirua Lake, and crossing the Ahaura and other rivers to the Buller. The view in this direction presents a level plain, unbroken by a single hill. To the north-west (the route I followed), through the Kotukuwakaho Pass, to within 3 miles of the lake of that name, was all a stony fern flat. The margin of the lake is covered with white pine-bush, extending to the hills on either side; through this bush I cut a line 3 miles in

length. On reaching the lake we discovered the sides to be so steep as to prevent travelling, and it became necessary to build a canoe to continue our course. This was accomplished, with a week's labour, by hollowing out a white pine-tree; and in this frail bark we succeeded, after some fruitless attempts made in too rough weather, in reaching the opposite side of the lake. The roar of the ocean was quite audible from this place.

The rocks at the north-east corner of the lake are granite, which joins the slate from the direction I travelled, and this is another favourable indication of gold. In looking across this lake you perceive a flat bush-country, the lower gorge of the Grey, or end of the Paparoa range; and at the northern corner of this lake there is an open patch of fern and flax, and a river that connects this with the Poherua Lake. A small river at the south-west corner runs from the lake to the sea (and has been used by the natives as a track to Port Cooper); and at the north-west the end of the lake is formed by the Kotukuwakaho, which discharges itself into the Grey. The lake is 6 miles long, by 5 wide. It encloses an interesting island, whereon stand the remains of an ancient pah, called Taka Taka. The waters of the lake have been subjected to such violent tempests that the large war-canoes formerly brought into it were often wrecked. I noticed growing on the shores of the lake a stunted tree, bearing very much the appearance of mahogany, and with a long, thin, glazed leaf. The birds found in this part of the country are paradise, grey and blue ducks, teal, the crested grebe, rail, white cranes, and sea-gulls, with an abundance of quail and woodhen on the plains.

My survey of the Kotukuwakaho, or Arnould River, was accompanied with much difficulty and risk.

The Arnould, at its source, is a wide river, taking the overflow of Lake Brunner, and for 2 miles, through a dense forest of pine and birch, has little current and no fall; but when joined by two streams from the north, falls follow each other in rapid succession, the current increases with such velocity that it becomes a race, and the snags are found so plentiful, even in the deepest water, as to leave no available channel whatever. I had many familiar proofs of the danger of the navigation, and often was our canoe in imminent danger of being capsized, and I had to rig canvas top-sides to prevent the water from swamping her. During several weeks past we had been on short allowance, and to lose our little stock of flour would have been utter ruin. Heavy rain fell incessantly, making the canoe sink deeper; the falls became more rapid and dangerous, so that it was a great task to steer her, and our only chance lay in keeping her head with the current. Trying to do this, the canoe struck a snag, sheered off, passed down a fall with the

utmost rapidity, then turning a sharp elbow in the river, we discovered to our dismay a tree projecting 50 feet across the river and about 2 feet above the water. The crisis was imminent, as we were running at least 10 knots an hour; but I ordered the men to lie down, and we luckily shot under this barrier without accident, although the dog had nearly lost his head from not understanding the word of command. We now sailed on merrily, but in another quarter of a mile danger again threatened us in the shape of a dead block of snags which impeded the river. Our only chance was to carry on all sail, trusting to the current to drag us across; but our calculations were erroneous, and the canoe, having run one-third of her length out of the water, stuck fast. We were therefore obliged to abandon our gallant craft; and so, securing the instruments, papers, and the remaining small stock of flour, we commenced our dreary march in the midst of a drenching rain, which continued through the day and night, and completely soaked us. We suffered other inconveniences besides those of wet and cold, for our larder boasted no greater delicacy than thin paste made of a tablespoonful of flour boiled in a quart of water. This we had twice a day while the flour lasted. In our exhausted condition we were enabled to accomplish but a short distance each day, and our small stock of flour soon vanished. One day we would have nothing to eat; another day only a small robin between three of us and the dog; and a chance pigeon or two on another day; until at length we reached the Maori pah. Here every civility and kindness awaited us; and though only potatoes were procurable, they were sufficient not merely to support life, but to stimulate appetites which for six long months had submitted to worse than English pauper's fare.

While with the Maories, I learned of the existence of the Ngati-mamoi tribe, or wild men of the bush. About two years previously a woman of this tribe had been captured by the Maories, but she soon afterwards escaped, and so little information was obtained from her.

I will now briefly enumerate a few of the advantages possessed by this West Coast district, which I have taken the liberty of naming Westmoreland.

The River Grey—having a considerable depth of water over its bar at low tide, 9 feet rise of tide, and deep water for several miles up the river—runs through the most extensive district of land in the province of Nelson available for agriculture. At the entrance of the river are two deep-water lagoons, conveniently situated, sheltered from all winds, and offering secure anchorage in the case of freshes, which are heavy during the rains. There is land admirably adapted for a town of considerable importance, and having at its other extremity the River Buller, which is of

much greater capacity than the Grey, possesses a finer harbour, and is free from the heavy swell which must always affect an exposed entrance. There is also, under Cape Foulwind, a sheltered anchorage from southerly winds, formed by a reef of rocks stretching out parallel to the coast. Seals, whales, and such other sources of wealth, abound in the vicinity.

The climate is extremely salubrious, and is, in my opinion, equal to that of Nelson. There is a good seam of coal visible, Potera logs of stupendous size strew the beach for miles, and vast tracts of red and white pine, totara, rata, and other timber but await the woodman's axe. Eels of great size abound in all the rivers, and birds of the parrot and apteryx kind are found in various parts of the country. A riwi (one of the latter genus, about the size of a turkey, and having spurs on his feet) will, when attacked by a dog, defend himself so well as frequently to come off victorious.

But the great desideratum is the discovery of a practicable line for the construction of a north road by which Nelson could be readily reached overland; and, from the opportunities I had of judging, I believe this will yet be found. The country will then be speedily opened up for settlement.

After recruiting our exhausted strength we left the hospitable Maories, and, travelling along the coast, we reached our homes about the end of July.

SECOND EXPEDITION.

On this occasion I proceeded to the West Coast by sea, and towards the end of August, 1859, I left Nelson in the cutter *Supply*, and reached the mouth of the river Buller after a protracted passage of fourteen days.

My original intention was to land part of my stores at the Buller and part at the Grey; but as it was very changeable weather, I deemed it prudent to land them all at the Buller. My intention now was to survey up the Buller, and carry the whole of my stores by canoe to a considerable distance up the Inongahua (a tributary of the Buller, capable of canoe-navigation) to where a low birch-range, about 3 miles across, divides it from the Mawhera-iti, a tributary of the Grey, whence I should be in a position to finish the survey of the Grey, besides having the benefit of a canoe to carry my stores nearly all the way. But I could not commence my survey until the return of a messenger whom I had sent to the Grey for extra hands, and he did not make his appearance for six weeks. This interval I employed in surveying the coast in the neighbourhood of the Buller.

I found the coast to the north of the river, for about 10 miles, to be a flat alluvium, deposited at successive periods by the river,

and extending to the foot of the hills, which are distant about 2 or 3 miles. These hills are composed of quartz and felspar (in some places containing mica), approaching to a coarse granite; and at the summit of the highest which I ascended (Papahaua, 2400 feet) several strata of fine slate crop out. Owing to the fog which enveloped the top of the hill, I could get no view inland, even after waiting for two days: and this fog will, I imagine, add greatly to the difficulties of a trigonometrical or topographical survey of the country. Towards the coast this flat is bounded by a belt of bush and scrub three-quarters of a mile wide; the remainder is open plain, divided by strips of bush-land. The streams which intersect the flat abound in eels, and I observed a seam of coal on the banks of the Waimangaraho. I noticed also that there are some very extensive valleys between the flat and West Wanganui, and it appears quite probable that through some of these valleys a bridle-track to Nelson might be obtained.

To the south of the Buller the coast is characterised by flat bush for about 5 miles, when the land rises into a low table of excellent soil, extending for 12 miles down the coast. Situated about a mile down the table is Cape Foulwind, the perpendicular cliffs of which, about 60 feet in height, consist of 40 feet of a slate-coloured sandstone layer of large boulders and 10 feet of gravel and soil. At the mouth of the Okari (one of the small rivers which intersect the table-land) I found large quantities of pumice-stone, which probably either came down the river or floated from Wanganui or Taranaki. In the rear of this terrace there is another plain, in some places 2 or 3 miles wide, and reaching from half a mile below the Buller to 6 or 7 miles down the coast. This plain has, at no distant period, been covered with a forest of Manuka, as the numerous stumps and dead trees abundantly testify. A series of similar plains, though of a smaller size, reach for about 20 miles down the coast, intersected by streams, in two of which—the Waitakeri and the Waitohi—I discovered seams of coal.

The long-expected natives having at last arrived from the Grey, I immediately started to survey up the river Buller. An extract from my journal will perhaps best describe this portion of my work:—

November 4th.—Surveying up the river, which is about a quarter of a mile wide, with fine level bush, interspersed with scrub on either side.

The south bank of the Buller offers advantages of no ordinary character for the formation of a town, being an accumulation of small islands and peninsulas, divided by deep-water channels available for navigation, forming a perfect Venice.

5th.—Entered the first gorge, about 4 miles from the river's mouth, which is narrow, deep, and singularly free from rapids;

the hills, clothed with small birch, rise at an angle of 80° from the horizon, and close abruptly on the water's edge.

7th.—Still a gorge, with hills in many places precipitously overhanging the river. Had to ascend many rapids during this day's work. The geological features are pieces of mica-slate and quartz, cemented together into a conglomerate of brown, green, and reddish colours.

8th.—Still working through the gorge, the slope of the hills getting more easy. Whilst chaining, I was surprised and no less gratified by one of the hands (F. Millington) announcing the discovery of gold; an event as unexpected as propitious, and one which must have a powerful influence on the future prospects of this long-neglected West land. The royal mineral was lying on the edge of the river, glistening in the sun, and in such quantity as induced rather a mutinous spirit; my hands having a greater preference for the golden prospects before them, than the sterner duties of surveying.

9th.—Started again. Country greatly improved; flats occurring at intervals, growing white-pine. Found gold again, and collected about 3 dwts. on the north side, lying on the surface.

10th.—River more open; slate still the prevailing characteristic of the district, and broken birch hills above.

11th.—Good pine-flats on each side of the river; the hills sandstone (similar to that used for grindstones) overlying slate, with the exception of one part, where a patch of gneiss occurs. I here had a view of a high range bearing southerly, and situated on the south side of the river, bare on the top, and apparently unbroken in outline. The river here abounds in very large eels, which are easily caught in the daytime below the rapids, where, under the shelter of a rock or snag, they await the arrival of the inonga or whitebait, myriads of which are this month in progress up the river, the rapids affording a partial barrier to their upward progress.

12th.—One small river flowing into the Buller from the north-westward, and two a little farther on from the south-eastward; the first having a large valley of bush with patches of fern, the two latter apparently joining at the back and forming one large wooded valley, running to the southward along the side of the range first seen yesterday. Opposite to this river, on the north side, high up on the hill, at a slip, I found a large fossil shell.

14th.—Thus far up the river is very fair navigation for a canoe. We had, however, to pass through a very bad granite gorge, with perpendicular rocks and cliffs on either side, surmounted by broken birch-hills.

15th.—Many bad falls occur in this day's work. Towards middle of day arrived at a large table-land on the north-west side

of the river, consisting of a good flat covered with bush. A conspicuous cliff, abutting on the river-bank, displayed 30 feet of clay-slate, and 10 feet composed of boulders, gravel, and soil above.

16th.—Delayed by heavy rain all day.

17th.—Entered another gorge. Strata, fine hard red granite. Midday, arrived at a rapid with a fall of 9 feet in one chain, which caused such a sea that the canoe would have been swamped had we attempted to haul her up it: added to this, the ground at the side was precipitous, and we therefore found it necessary to build a scaffolding to haul the canoe over, which caused a delay of five hours. Here the eels and inonga literally swarmed. One would think this fall would be an effectual barrier to the latter, but they had the ingenuity to climb the perpendicular faces of rocks, which were literally black with them as they scrambled over the top and dropped into the eddy above; so numerous were they, that one might take a hat and brush it full with the hand.

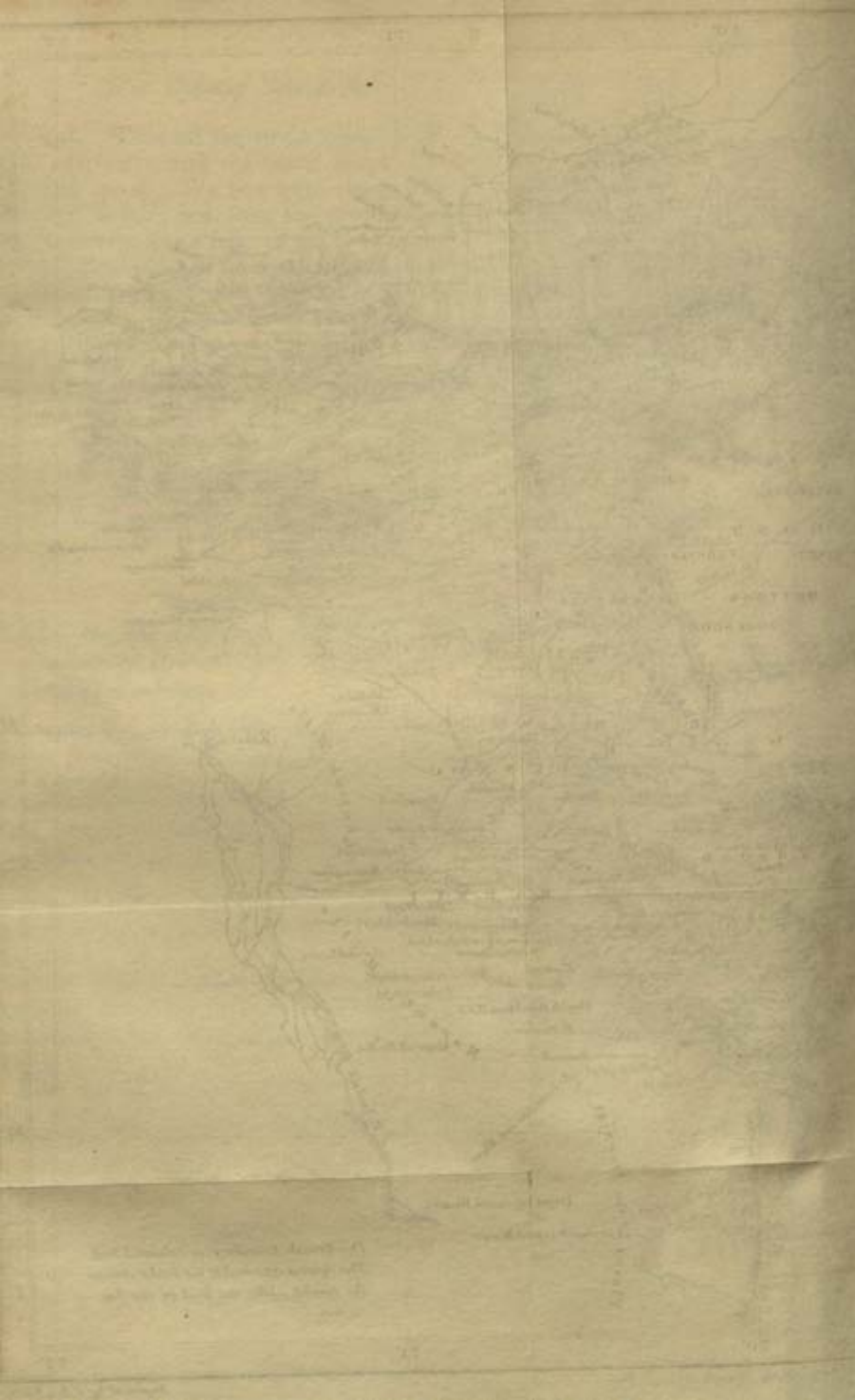
18th.—Occasional flats; slate strata still visible; found gold again on the south side of the river.

19th.—Very hard red granite gorge. The river in most places contracted to 50 links, and of enormous depth. I ascertained the fresh to rise upwards of 60 feet in this gorge.

21st and 22nd.—River of similar character.

23rd.—The same rough description as previously, the river being one continuous rapid; in many places so deep that we could neither pole the canoe on the bottom, nor scale the cliffs to haul her up with a rope, but were obliged to push her up from the projections and little cracks in the cliffs, and many times were carried round and had to work our way up again. Having proceeded a little farther, we got on shore on the granite rock, and found gold lying in the dips and cracks, carried there by the fresh.

24th.—This morning arrived at a bad fall, where we had to construct another scaffold and haul the canoe over. My guide here acknowledged that he could not recognise the river at all, and said he thought we were past Inongahua; but from not having seen a flat similar to what Oweka was described to me, I did not like to return. Towards the afternoon the gorge widened out to 3 or 4 chains again, and occasional flats occurred, displaying a slate country. We now appeared to have got clear of the gorges, but soon came to a very bad fall, up which it was necessary to haul the canoe; the ground at the side was almost impassable rock, but we carried some of the flour out to lighten her, and proceeded to haul her up, when in the strength of the rapid a sudden bend in the stream carried her head outwards, and the force of the current took her nearly across the river, burying her head beneath the water and dragging the rope away from us, as, from the narrow ledge on which we had to stand, we could not properly exert our

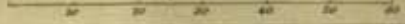




Map showing
Recent acquisitions to the Geography of the Districts
Bordering the
BRITISH TRANS-INDUS FRONTIER
between

Peshawar and Dera Ismael Khan
Compiled under the Superintendence of
Major J.T. Walker, F.R.G.S.
Supl. G.T. Survey.

English Miles.



Long. East of Greenwich

The British Boundary is coloured Red.
The figures attached to the Peaks denote
the heights above the level of the Sea
in feet.

strength. Thus all the strain came on the back rope, which was also torn away, and the canoe swept down the stream with unchecked speed. We now gave chase, with the intention of swimming off to her; but, from the precipitous character of the banks, she was swept away fully six miles to our one, and was soon out of sight. Evening had now set in, and darkness quickly closed on us, which, together with the loss of all the instruments, cooking-utensils, axes, &c., made our camp most miserable, several of us being without blankets and tents, and our only consolation being that we had plenty of flour on shore. I now determined on returning next day by the side of the river, with the hopes of perhaps recovering the instruments. After three days' toilsome journeying, we discovered portions of the canoe, broken across the grain into several pieces; as also a tomahawk, which had by some chance got jammed into one of the pieces of the canoe, testifying to the tremendous force of the rapids through which she had passed.

XXI.—*On the Highland Region adjacent to the Trans-Indus Frontier of British India.* By Major JAMES WALKER, of the Bombay Engineers, &c.

BETWEEN the crest of the Soolimani range and the well-known routes from Upper Sind to Kandahar, Ghuzni, and Kabul, there lies a tract of hill country extending over 5 degrees of latitude and 2 degrees of longitude, of which little is known up to the present date. Chiefly inhabited by tribes of fanatic Mahomedans, whose hands are against every man, and every man's hands against them, these hills are peculiarly difficult of exploration. Though they have been crossed at one or two points by Europeans in disguise, they have only once been avowedly entered by British officers, on the occasion of the memorable mission of the brothers Lumsden in 1857-58 from Peshawur to Kandahar, through the valley of the Koorum, which lies on the southern skirts of the Safed Koh mountains, where it abuts at right angles against the Soolimani range.

Like the Scottish Highlanders of old, the inhabitants of these hills prefer to subsist on the wealth of their lowland neighbours rather than on their own exertions. Occasionally their raids are directed against British subjects, when it becomes necessary to despatch a force against them to exact retribution for past offences and security for future good conduct. On these occasions opportunities are presented for acquiring some knowledge of the geography of countries which are otherwise sealed to Europeans.

During the progress of the operations of the trigonometrical

survey along the line of the Indus from Attock to Karachi, projects were often formed for ascending the peaks of the Soolimani range, with a view to extending the triangulation westwards. The whole of these peaks have been accurately fixed, and, as they command extensive views, they would form excellent stations for observations. Towering high above all the others is the Tukht-i-Sooliman, the Throne of Solomon, which is situated at no great distance beyond the British boundary, opposite the town and cantonments of Dera Ishmael Khan. It has for many years been viewed with longing eyes, not only by surveyors but by all Europeans located in the neighbourhood, who are naturally anxious to exchange the oppressive heats of the Derajat for the bracing climate of the high mountains. The Tukht is celebrated as one of the many fabled resting-places of Noah's ark. Its summit, described as a narrow plateau about 5 miles long, stretches from north to south, with culminating points at either extremity, the northern peak being 11,300 feet above the sea, and the southern only 220 feet lower. Thus from this one mountain alone a vast addition might be obtained to our knowledge of the country beyond. Its two peaks would form the base of trigonometrical operations extending over upwards of 10,000 square miles of a terra incognita. So short a base as 5 miles would necessitate the employment of superior instruments, that the acute angles subtended by far distant objects might be determined with the requisite accuracy; but, on the other hand, the difficulty of identification, which occurs when stations of observation are far apart, would be avoided.

There are probably few mountains hitherto unvisited by geographers which might be made to yield so rich a harvest of information as the Tukht-i-Sooliman. But political difficulties have hitherto compelled the Punjab Government to refuse to permit any British officers to attempt its ascent, which therefore still remains to tempt the hardy and adventurous explorer with its certain perils and prospective rewards.

The Soolimani range, as seen from the Indus, appears to rise from the plains like a wall, parting the eastern watercourses from the western; but on nearer approach it is found to be pierced at numerous points by streams, which take their rise far west among hills lower than the outer range through which they break ere entering the plains. A similar feature characterizes the Himalayas, where the principal watersheds lie in the remote interior beyond the pinnacles whose heights give celebrity to the range. Sir Jung Bahadoor pointed out this circumstance, when he was in England, and observed that our map-compilers had greatly lessened the apparent size of Nepaul by drawing straight lines between the chief peaks to represent the watershed, which in reality lay 30

miles, on an average, farther towards Chinese Tartary. The interior ranges would seem to be of a greater mean elevation than the stupendous outer ranges, and to preserve a more uniform level. Though the peaks of the latter are highest, their gorges are lowest, and thus permit the exit of the waters of the interior to fertilize and enrich the plains below.

The rivers of the Soolimani range have little in common with those of the Himalayas. They scarcely merit the designation of rivers; for even when of considerable length they are but the dry beds of watercourses during the greater portion of the year. There is little moisture to feed them in their parent mountains, which are insignificant in mass and altitude compared with the Himalayas, and desiccated by the heat radiated from the extensive plains to the east and west. Vegetation is scarce; the soil is dry and arid; pine-trees are not to be met with at a lower elevation than 9000 feet; and the climate of any given altitude would find its equivalent in the Himalayas 2000 or 3000 feet nearer the sea-level.

Thus the Gomul river, which takes its rise in the hills near Ghuznee and has several important affluents from the south, probably drains an area of 13,000 square miles. During the rains it stretches over the plains below Dera Ishmail Khan to a breadth of 10 miles; but in ordinary weather it dries up, or is absorbed for purposes of irrigation, before it gets half across the plains on its way to the Indus. None of the other rivers get even thus far, excepting when swollen by rain. The Takke Zâm, though rising in mountains upwards of 11,000 feet high, reaches the plains as a feeble stream, barely sufficient to irrigate the lands of the little town of Tak. On the maps these rivers appear to end as they began, in little streamlets; and it would be difficult to guess their direction, and to distinguish their beginnings from their endings, but for the hill-shading which indicates the higher ground where they must needs originate.

The maps accompanying this paper exhibit the latest acquired information of the tract of country between the Gomul river and the Safed-Koh range, the British boundary, and the city of Ghuzni. It is only here that any recent additions of importance have been made to our geographical knowledge of the districts beyond the Trans-Indus frontier. These additions are due—1st, To a survey of the Koorum Valley as far west as the Paiwar Pass, by the late Captain Garnett, Bengal Engineers, and Captain Peter Lumsden, Assistant Quartermaster-General, during the Koorum Expedition in the autumn of 1856; 2nd, To the extension of this survey to Ghuzni by Captain Lumsden, while accompanying his brother on the mission to Kandahar in 1857-58; 3rd, To a reconnaissance of the country of Kabul Khel Wazeeris by Captain Johnstone, Topo-

graphical Surveyor of the Derajat, in 1859; and lastly, to a reconnoissance of the Mahsood Wazeeri district in 1860, in connection with the trigonometrical survey. The belt of country between the western boundary of the Derajat and the crest of the Soolimani range has been surveyed with more or less accuracy by Captain Johnstone in connexion with his topographical operations; and being shown in his maps, which are in course of regular publication by the Surveyor-General of India, need not now be described.

All but the second of the operations above enumerated were accomplished during military expeditions under the command of Brigadier-General Chamberlain, C.B., to check the forays of the hill tribes. The Koorum expedition entered the territories of Dost Mahomed Khan, the ruler of Kabul, who, being unable to control his own subjects, consented that a British force should proceed among them to effect the restitution of stolen property. This was accomplished without resistance or opposition of any kind. The Naib, or deputy-governor of the district, accompanied the expedition to render assistance, and is believed to have made use of the opportunity to collect revenue for his master under the protection of the British force. Thus the whole Koorum valley, from its eastern entrance beside the British boundary, was peaceably surveyed as far westwards as the Paiwar Pass. Shortly after the return of our troops to their respective stations on the Punjab frontier a marvellous change came over our political relations with the frontier tribes. The great mutiny of the Bengal army commenced, and the Punjab troops were again collected together to be marched, not westwards, as hitherto, against external foes, but eastwards into the heart of British India, against soldiers who for many generations had served under the British banner. They shared in all the operations of that eventful crisis, the siege of Delhi, relief of Lucknow, and battles and skirmishes innumerable. Meanwhile their places on the frontier were taken by the very men who, hitherto only encountered as the foes of the British Government, had now become its servants and supporters.

Of all the tribes along the Punjab frontier, only the Wuzeeris held sullenly aloof from us during this critical period. They continued to make petty aggressions, which for a time could only be checked by defensive measures, such as strengthening the outposts. But when the mutiny had been trodden down, and the Punjab troops returned, with many a blank in their ranks, to their stations on the frontier, we were in a position to demand more respectful treatment in future, as well as compensation for past losses.

Thus in the winter of 1859-60, just three years after the Koorum expedition, Brigadier-General Chamberlain led a force against the northern or Durweshkel Wazeeris; and in the following spring

another force against the southern or Mahsood branch of that tribe. And so the four years 1856-60 have witnessed considerable additions to our knowledge of territories never before trodden by Europeans, notwithstanding that for the greater portion of that period we were at war with almost all India, and often struggling for bare existence.

When the geographer has before him the results of the expeditions so happily conducted by General Chamberlain, and then turns to the map of Asia and notices how much is still unknown of the countries beyond the British boundary all along from Peshawur to Eastern Assam, he cannot repress a feeling of disappointment at the passive obstruction of the inhabitants of Chinese Tibet and Tartary, nor restrain a preference for the manners and customs of the Wuzeeris, which necessitate active measures on the part of the British Government and result in expeditions of exploration.

The range of mountains known as the Soofaid, or Safed Koh, forms the northern boundary of the tract of country now under notice. Rising out of the high table-lands south of Kabul, it follows the parallel of 34° of latitude for about 100 miles; then turns to the N.E. on approaching Peshawur, and terminates on the Kabul river opposite the hills of the Momunds and Bajour. Its highest point is the Seekaram Mountain, 15,622 feet above the sea, whence the range preserves a tolerably uniform level, perhaps nowhere less than 12,500 feet, until it again culminates in a double peak mountain, whose summits average 14,800 feet. I have been unable to learn the local names of these peaks, or whether, like the Seekaram Mountain, they tell of a remote antiquity, when the country was ruled by Hindoos, long anterior to the origin of Mohammedanism.

The offshoots of this range have usually an east and west direction, and are remarkable for their parallelism with each other and the parent range. The most important, though not the highest, of these stretches away to Attock, and is the southern boundary of the Peshawur Valley, dividing it from the system of valleys of which the Kohat district is composed. Before entering British territory it forms the southern barrier of the Teerah Valley, the home of the Oorukzai Affghans, which is celebrated throughout the surrounding regions for its beauty, fertility, and genial climate, and which no European has ever yet entered.

North of Teerah is the Valley of Bara, of less size and importance; while next beyond, and somewhat towards the north-east, is the world-famed Khyber Valley, the principal gateway of northern India, through which all the western invaders of Hindoostan have marched their forces, and which British troops have stormed on more than one occasion. The watershed of this pass is at an alti-

tude of 3400 feet above the sea, and 2200 feet above the Peshawur Valley. It is on the main range, which, ere it terminates in the valley of the Kabul River, rises once more to a height of 6800 feet at the Tartarra Peak, of familiar aspect to all who have resided in Peshawur.

South of Teerah is the Alisherezaï Valley, which again is separated by the Samana range from the continuous British valleys of Meerunzaï and Hungoo, inhabited by the Bungush tribe, who are subject to the British Government.

The general parallelism of the ranges offshooting from the Soofaid Koh is very advantageous in enabling a surveyor to determine approximately the positions of the villages which are hidden in the valleys below. Facing them at right angles to their prevailing direction, he bids his native guides point the telescope of a theodolite towards each village in succession. Their local knowledge enables them to do this with considerable accuracy, as is easily tested by recording the reading of the instrument, throwing it off the direction given by one man, and letting the others set it in turns on the required position. The accordance between the values thus obtained from different persons is most surprising, particularly when the informant is a pugnacious Pathan, who is told to lay the theodolite as he would a matchlock on an enemy dwelling in the place whose position is to be determined. All the best known and most important villages have been thus fixed probably within a mile or two of their true positions; for the valleys are narrow, and the crests of the limiting ranges on either side being clearly visible from the stations of the survey were fixed by actual measurement.

That "events repeat themselves" is a law of Nature, which is stamped on the mute records of the earth's crust as legibly as it is written in the histories and annals of her inhabitants. It is well illustrated in these districts, where, throughout extensive tracts of country, marked similarities of effect are often met with which point to the repeated action of similar causes. The singular parallelism of the above-mentioned ranges is the more remarkable, as being found to occur even when they deviate from their normal direction of west to east. Thus the Teerah River, on approaching Kohat from the west, turns to the north, and then back westwards for a long distance before it finally resumes its easterly direction. A course precisely similar to this is taken by the waters of the adjacent Kohat Pass, in which the abnormal deviations of the Teerah River are repeated on a smaller scale. In the low sandstone ranges the valleys are usually straight and parallel to each other, and are connected at right angles by abrupt gorges, through which water falls from the higher valley to the lower in a succes-

sion of drops more or less perpendicular. The waters pass over two sides of a parallelogram, rushing in straight lines from angle to angle, instead of meandering along the diagonal.

In the limestone ranges the north-western faces are uniform slopes of 30° to 60° , without spurs; while the opposite faces are scarped and rugged, and overhang great spurs, which are separated by deep gorges very difficult of access. This often-recurring feature may be aptly illustrated by arching one's hand on a table: then, if the knuckles are taken to represent the watershed of a range of limestone tending north and south, the back of the hand will represent the smooth western slopes, and the open fingers the eastern spurs with their deep dividing gorges. In the high sandstone ranges the western slopes are similarly smooth from top to bottom; but, instead of being continuous for some distance longitudinally, they are broken into spurs resembling those on the opposite side of the watershed, excepting that the western slopes face away from the crest of the range, while the eastern slopes face towards it. This is owing to the general parallelism of the strata, and their dipping towards the same point of the compass. The dip is usually about 50° , and the prevailing appearance of the spurs and their offshoots is as if they were formed of a succession of triangular slates, like inverted Vs, gradually diminishing in size as they approach the foot of the range. The sandstone is of a very soft, friable nature; masses falling from a height into the watercourses are instantaneously disintegrated and turned to sand by the shock, and swept away by the first shower of rain. But the rock invariably wears in layers parallel or perpendicular to the original stratification, and thus the features of the range are little altered by degradation, and are never rounded off, as is the case in ordinary formations. The watercourses are limited to two directions, which are either perpendicular or parallel to the trend of the range, and it is thus their special characteristic to be incessantly turning corners at right angles without sensibly rounding their channels. The watersheds are invariably narrow, both in the limestone and sandstone ranges: in the former they are usually flat, in the latter jagged and serrated. High table-lands are sometimes formed in the trough between two ranges of sandstone and limestone, when in close juxtaposition; but in neither formation are the crests more than a very few feet wide, often narrowing to mere knife-edges, with a deep perpendicular drop on one side and a perilous slope of 60° on the other, rendering it necessary for all but the most skilful mountaineers to go over straddling, with one leg on either side the mountain.

The principal river of the southern valleys of the Soofaid Koh is the Koorum, which rises at the junction of the Soolimani range with the Soofaid Koh. Among its chief sources are two streams;

one going eastwards from the Shooturgurdun, or Camel-neck Pass, the other westwards from the Paiwar Pass through the Hurriab Valley; they unite in the Chumkunni district, where they are joined by streams issuing from the valleys of the Mungulo; the combined waters enter Koorum in one broad and deep torrent. The two passes just named are on the direct road from Kohat to Ghuzni; the Shooturgurdun is on the watershed of the main range, and is no less than 11,500 feet high, as determined by Captain Lumsden's observations. The Paiwar Pass is not on the main watershed, but merely over a prominent spur from the Safed Koh. It is about 7000 feet high, and derives its name from the populous and wealthy town of Paiwar at the foot of its eastern ascent. It can be avoided altogether by a circuitous route through the Chumkunni district to its south.

In the Report of the mission to Kandahar the Koorum district is described as "picturesque and attractive in the extreme to an European stranger fresh from the plains of India. A clear and rapid river, which has its sources in the pine-clad slopes of the Safed Koh mountains, which shut in this valley on the west and north, rushes in a winding rocky bed down the centre of a deep fillet of rich cultivation sprinkled with villages, each having its clumps of magnificent plane-trees, while the distance is everywhere closed by the ever-varying aspect of the noble mountains just mentioned, which tower over the valley in its whole length.

"In the centre of this district, and about 25 miles from the Paiwar Kothul, stands the fort of Kurram, the residence of the local governor. It is a square mud enclosure, with faces about 100 yards long, having 'burjes,' or round towers, at the angles and in the centre of each face. The district is part of Sirdar Muhammad Azim Khan's jagir, and yields about 60,000 rupees per annum, of which some 12,000 rupees are collected as transit-duty on kafilahs, and the remainder is land revenue. The Sirdar seldom visits the country himself, but governs it through a deputy or 'naib.' Collections can only be made by a considerable force, which is usually sent over from Cabul, and, when it does arrive, sweeps the whole country clean before it. The soil produces both the robbi and kharif crops, the chief product being rice, which is cultivated in sufficient quantities to admit of extensive exportation to Cabul and neighbouring countries. Wheat, barley, Indian corn, and a little cotton are also grown.

"All the irrigated lands are close along the banks of the river, and whenever extraordinary floods sweep away any portion of these fields, it is a common practice to plant rows of willows, as thickly as they will stand, and to keep them cut down to two or three feet in height for some years. These, spreading, form a very complete barrier, which in ordinary floods catches and retains

a rich deposit of alluvial soil; when dry, a crop is sown on it, while each succeeding flood only adds to the depth of the deposit. The cultivator loses but one crop, and in a very few years regains a fine field supported on a living willow wall.

"Between this cultivated tract along the bank of the river—on the edge of which most of the villages are placed—and the bottom of the lowest slopes of the Safed Koh (called by the natives Tissin Ghur), lies an unculturable tract, varying from 2 to 10 miles in breadth, and sloping down towards the cultivation, where it terminates in an abrupt bank, having a command of from 20 to 60 feet above the irrigation. It is barren and strong, and intersected by numerous deep ravines, down which flows the drainage from the adjacent mountain."

The Koorum district is inhabited by the Toori tribe, who, says Colonel Lumsden, "with their neighbours the Jagis, are supposed to be of Mogul origin, and are not considered Pathans, from whom they differ in physical appearance, dress, and many customs." Below this district the course of the Koorum River is s.s.e., through a valley that is more or less closed in on both sides by hills which are inhabited to the north by Zymookht Affghans and Bungush tribes subject to the British Government, and to the south by Wazeeris. At length the river passes into the plains of Bunnoo, where its waters are turned aside into numerous canals for purposes of irrigation.

Its most important affluents are the rivers of Khost and Dour, both of which take their rise in the northern prolongation of the Soolimani range. Khost is described as more of the shape of a basin, than of the narrow strip of plain fenced in by hills which is the prevailing type of these valleys. It is drained by three streams, the most important of which is the Shamil Nuddi. All three unite into the Keyti, which falls into the Koorum about 11 miles above Bunnoo. Khost is subject to the ruler of Kabul, and pays him revenue, but only when troops are sent to collect it. The inhabitants live in small hamlets scattered apart from each other. They have no large villages; they are divided into numerous clans, the respective localities of which are approximately shown on the map, as gathered from native information.

Between Khost and the British boundary, which on the parallel of $33^{\circ} 15'$ recedes 20 miles eastwards, there is a network of low hills on both sides of the Koorum River, forming part of the lands of the Wuzeeris. This important tribe has two principal divisions, the Derwesh Khel and Mahsood: the former occupying the northern lands of the tribe, and the latter the southern. Both are subdivided into numerous khels or clans, one of which, the northern Kabul Khel, caused by its aggressions the first British expedition into the territories of this tribe.

The Durwesh Khel Wuzeeris "are a wild wandering race, living in black tents, called in their language Ghizdis." Like the pastoral races of the Khirgiz steppes in Central Asia, their wealth is in their flocks and herds. A very few have been induced to settle and cultivate lands and build houses in the Bunnoo Valley. In the winter months the grazing grounds of this tribe are among the low hills adjacent to and within the British frontier, but in summer they betake themselves to the Turghar Mountains, where the Dour River is said to rise. Though of Affghan descent, they pay no revenue to Kabul.

Dour is a rich and highly-cultivated valley, having a considerable breadth of land within reach of its fertilizing river. The sources of this river are still uncertain. Viewed from Bunnoo, it would seem to rise in the line of hills connecting the Tukht-i-Sooliman with the Safed Koh. But the volume of water it discharges suggests a far more distant origin, and there seems much reason to believe that it rises beyond Oorghonj, in the southern slopes of the Zoormut Mountains. Probably the eastern slopes of the Zadran range also drain into this river, in which case the true Soolimani watershed must here lie more than a degree to the west of the line joining the highest mountains of the range. The river is called the Lochee while within the hills, and the Gumbela when it enters the plains of Bunnoo. Below the fort of Lukki it merges its waters and name into the Koorum River, which, after a further course of about 20 miles, falls into the Indus.

From the plains of Bunnoo and the northern Derajat two lofty blue mountains are visible in the west, where the Mahsood Wazeeris have their summer residences. One of these, the Pirghul, near the town of Kanigoorum, is 11,580 feet above the sea-level, or about 280 feet higher than the Tukht-i-Sooliman; the other, Sheweydur or Shah Hyder, is 300 feet lower than the Tukht. Both more closely resemble the mountains of the Safed Koh range in appearance and geological structure than the portion of the Soolimani which lies between the parallels of 28° and 32° , immediately adjacent to the plains of Derajat, where nummulitic limestones predominate, and the formations generally are comparatively recent. There would seem to be a gradual transition from one range to the other, in direction as well as formation.

Between the highlands of the Wuzeeris and the plains of the Derajat there are belts of low hills of sandstones and conglomerates, which are inhabited by a small tribe of Pathans known as the Bittunnies. In these outskirts of the Soolimani range there are long narrow strips of valleys, suggestive of the well-known Dhoons between the Siwaliks and the Himalayas. But the Bittunni Dhoons are very unlike their Himalayan prototypes. They are bare, stony, and uncultivated; for the streams from the higher

hills, in passing through them, rush across abruptly breadthways, with a minimum length of course, and too low depressed for their waters ever to rise to the surface of the plains on either side; whereas the Himalayan Dhoons are watered by streams which wind through their whole length and linger among them until they leave no portion unfertilized.

In the Bittunni Dhoons there is another exemplification of the tendency to repetition, already noticed in the action of the forces to which the present features of the ground are due. The successive belts of plains, locked in between the hills and the streams from the interior, slope continuously southwards, like the glacis of a fortification, from the scarped bank of one stream to the brink of the next. They have no middle waterparting, as might naturally be expected, but each drains into a single stream. This feature is repeated, on a large scale, in the Ruzmuk plain, beyond Mukkeen, which slopes gently southwards; while to the north it terminates in an abrupt scarp over the valley of Kissarah.

The portions of the stream-beds which are intercepted between the hills and the Dhoons bear some resemblance to the crater of a volcano, the surrounding strata dipping concentrically to all points of the horizon. The outer and lower hills dip generally towards the east, and the minor ones towards the west, though occasionally anticlinal strata are to be met with in both.

In the accompanying note by Dr. John Lindsay Stewart, of the Bengal Army, on the flora of the country passed through by the expeditionary force against the Mahsood Wazeeris, which the author has kindly placed at my disposal for a submission to the Royal Geographical Society, the route of the expedition is so closely described that nothing further need be said on the subject.

Two copies of a map constructed on the occasion, on the scale of 2 miles to 1 inch, and subsequently lithographed in the Surveyor-General's office in Calcutta, are herewith forwarded in addition to the manuscript map, scale 8 miles to 1 inch, expressly prepared to accompany this paper. The lithographed map shows at a glance the physical characteristics of the district,—the hills, the shingle plateaux called "*rughzas*" by the Wazeeris, and the negative, or "*river valleys*," as they are appropriately designated by Dr. Stewart. The green spots indicate lands under cultivation, which will be seen to be chiefly carried on in the beds of the mountain-torrent, where the waters are made to deposit their sediment and form fields, in the manner described by Colonel Lumsden. Occasionally portions of the *rughzas* are cultivated, irrigation canals being brought to them from considerable distances. Much ingenuity is exhibited in carrying these canals along the face of the hills, and tunnels have often to be excavated for this purpose.

Water is the great want of the country. For lack of it the

Dhoons and rughzas usually bear only thin grasses and stunted bushes; whereas they have a sufficiency of rich soil to yield luxuriant crops of wheat and barley, if only they could be irrigated. Thus extensive tracts remain spell-bound, and the surface of the lands under cultivation, on which the inhabitants chiefly depend for their cereals, does not amount to more than 2 or 3 per cent. of the whole district. Under such circumstances, it is no wonder that the fanatic Mussulman mountaineers should readily bring themselves to believe that there is a wild justice in their favourite pastime of plundering the inhabitants of the rich plains at their feet, and that they are fairly entitled to obtain a forcible restitution of the rights which heaven must have intended for Mussulmans rather than Hindoos, and for stalwart highlanders rather than the puny inhabitants of the plains.

The range of hills immediately west of the Bittunni Dhoons is chiefly composed of the peculiar sandstone formation previously described in detail, whose strata are disposed in such a manner that they appear like a pile of V-shaped slates leaning against each other, with the points of the Vs upwards. West of these are low hills of limestone, somewhat akin to what have been already described as associated with this kind of sandstone, but comparatively insignificant in size and extent. There are also some instances of sandstone ridges, which curve round like horse-shoes, and present perpendicular scarps externally; while the ground enclosed by the watershed slopes gently inwards, and is more or less elevated above the surrounding country. This horse-shoe form is very prevalent in the low hills of the salt-range between Kohat and Bunnoo.

The river-valleys vary in breadth from half-a-mile to a few feet, being narrowest when breaking through the axis of a range, and broadest just before doing so, when the waters sometimes rise like a lake behind the barriers which impede their progress. Here there are usually little oases of cultivation. The main roads of the country traverse the watercourses, and during rains are sometimes closed for days together. The barriers are called "tungis," or narrows, by the natives, and are usually the places which they select to make a stand against external aggression. At the Junis Tungi—the first through which one passes ascending the Tâk-ke-zâm—a Sikh army was successfully opposed, and we expected opposition, but passed through without seeing a foe.

A little above is the junction of two rivers: one coming from Kanigoorum, Mukkeen, and the northern valleys, the other from Shahoor. Here a portion of the force was left under command of Colonel Lumsden, encamped on a "kuch," or patch of culturable land—so called from the native word "kucha," unbaked, green—while the remainder advanced up the Shahoor Valley, under

General Chamberlain, with the intention of exploring the country and visiting a set of noted marauders known to be located in this direction. The Wazeeris availed themselves of the separation of the force to make a night attack on Colonel Lumsden's brigade; they succeeded in overpowering the pickets, and entering pell-mell with them into the camp; but after a sharp hot fight, in which we lost more than 200 men killed and wounded, they were repulsed with heavy loss, and pursued for several miles towards the higher ranges. When General Chamberlain's column returned, the reunited force proceeded up the Zâm towards Kanigoorum, passing through several tungis, but opposed only at one, the Barara Tungi, where the Wazeeris and their allies were collected, to the number of nearly 10,000, to oppose our progress. They had barricaded the pass, and added to the natural strength of the position by numerous breastworks constructed along the crests of the hills. Here one of our assaulting columns suffered a temporary reverse, but soon rallied, and drove the enemy out of a very strong position, though not without a loss on our side of one officer killed and some 80 men killed and wounded. Our further progress was not opposed, but distant shots were fired into the column daily, and the rearguard was always more or less engaged with the enemy.

On reaching Kanigoorum we found that the women and cattle had been taken to the summits of the range above. This was unfortunate, as there was thus no possibility of ascending the Pirghul and Shah Hyder mountains, to obtain the long-wished-for view beyond, without hazarding the loss of many valuable lives, for which a survey would not have been a sufficient equivalent. Moreover, we eventually became in want of provisions, because we were disappointed in our expectation of replenishing our commissariat at the town of Kanigoorum, and were wholly dependent on the supplies originally brought with us from the plains; consequently our return was necessarily somewhat hurried, and time did not even permit for a survey of the country between the Tâk-ke-zâm and the valley of Kissara, through which we marched on our way back to British territory.

There are two chief towns in the country of the Mahsood Wazeeris, Kanigoorum and Mukkeen. The former consists of about 1200 houses, which are picturesquely built on the sides of a narrow ridge, isolated from the surrounding hills. The outer walls of the houses rest on fir poles planted vertically into the slope of the hill, with horizontal timbers thrown across, which form a flooring for the rooms above and cover over the ground below. The chief roads of the town pass under these covered ways, which are, however, barely high enough for horsemen to ride under. Mukkeen contains nearly as many houses, but they stand in several

separate groups, and are not so imposing in appearance as Kani-goorum. Iron-ore is found in the surrounding hills, and yields a metal which is highly prized by the natives, and is exported in considerable quantities into British territories. Every village and hamlet has its smelting-furnace, constructed with a conical roof of long poles planted nearly vertically in the ground. The ore is poor and scanty, and the iron extracted from it is said to owe its value chiefly to being smelted with charcoal.

Perhaps the most remarkable feature of the whole district is the Ruzmuk plain before alluded to, which lies right across the watershed of the range connecting the Shah Hyder and Gubbur mountains, and is 7 miles long by 2 on an average broad, with a mean elevation of 6,800 feet above the sea. It has a very gentle slope southwards, and its waters drain into the Tâk-ke-zâm. On the north it terminates abruptly in a perpendicular scarp of about 400 feet over the valley of Khissara. Here the road descends down a spur, and is narrow and difficult, but a few hours' labour rendered it practicable for our 9-pounder guns to descend, dragged by horses. If ever our relations with the Mahsood Wazeeris are sufficiently friendly, we may find the open and elevated plain of Ruzmuk admirably adapted for cantoning European soldiers. The soil is sandy, and vegetation is not too luxuriant to be unwholesome. Within 5 miles there are mountains 11,000 feet high, on which sanatoria might be established. Judging by the inhabitants, the climate must be peculiarly healthy; for they are handsome, well made, and vigorous beyond the average even of Affghan mountaineers.

*Office of Trigonometrical Survey of India, Calcutta,
March 30th, 1862.*

XXII.—*Notes on the Flora of the Country passed through by the Expeditionary Force under Brigadier-General Chamberlain, against the Mahsood Wazeeris; April 17th to May 19th, 1860.*

By JOHN LINDSAY STEWART, Esq., M.D., Assistant-Surgeon.

PREVIOUS to the end of 1859 the tract of country which includes our trans-Indus territories and the mountains to the westward, *i. e.*, from Peshawur to Mittunkote, and from the Indus to Ghuzni, was a *terra incognita* to botanists. On all sides of this space circumstances had enabled more or less to be done to elucidate the flora, but the district I allude to would, in a botanical chart, have been a perfect blank. In these circumstances, and especially in these days, when access to an unexplored district—acmé of delight for the pursuer of any branch of natural history!—is so rare, I

might well be gratified at having it in my power, through the kindness of General Chamberlain, to accompany the first and second Wuzeeree expeditions, and thus to do what in me lay, and circumstances permitted, to fill in some few of the details in a part of this blank.

I may preface my remarks on the flora of Wuzeeristān by the statement that, botanically speaking, the exploration of any part of this tract must be interesting from the circumstance of its tending to show the relative distribution of members of the Persian and Indian floras which lie on either side of it; and this even although, as in the present case, the country be arid and stony, the climate dry, and therefore the flora numerically a poor one.

The first expedition against the Wuzerees was necessarily undertaken in the "dead of winter," and without the important supplement of the second its botanical results would have been of comparatively trifling value, as of course many of the specimens collected during the former consisted only of a scrap or a few leaves. In this sketch, therefore, I shall chiefly confine myself to the vegetation of the country of the Buttunnies and of the Mahsood and Momeetzāi Wuzeeris, which the second expeditionary force passed through in its progress from Tāk, the place of rendezvous, up the ravine of the Zām stream, to Kanigoorum, and thence down the Khyssore to Kurano, where it broke up; and I shall adopt a modified "diary" form as perhaps the best suited to my purpose.

In connection with the native names of plants, Pū. will represent Pushtū (the language of the Affghans), Pī. for Punjābī, and Hī. for Hindustānī.

The city of Tāk, near which the force assembled, is situated in an oasis of date-trees and cultivation (at that season—April—chiefly of barley and beardless wheat), which looked very refreshing after the excessively dry and dusty country on either side of the southern fork of the trans-Indus Salt Range, through which our road had lain. Irrigation is accomplished by a cut from—I believe—the Zām of Tāk, a stream which issues from the But-tunic Hills a few miles to the west of the city.

Almost the only trees besides the date-palm were fine *Dalbergia sissoo* (*shūsham* Pī., *shewa* Pū.), along the watercourses; *Tamarix dioica* (*furās* Hī., *furwā* Pī., *khwa* Pū., and *ghuz* Persian), common as jungle; mulberries, and the large variety of *Zizyphus jujuba* (*ber* Hī., *berra* Pū.).

Capparis aphylla (*karīl* Hī., *kīrrā* Pū.), covered with its showy flowers, was abundant, and the other ordinary shrubs were as follows: the small variety of *Zizyphus jujuba* (*jharberī* Hī., *karkan* Pū.); *Prosopis stephaniana*, generally a small shrub, and just coming into flower; *Acacia farnesiana*; and *Salvadora*. The

last (*pīlū* Hī., *plewan* Pū.) is common at many places along the frontier, and its fruit is held by the inhabitants to be a great provocative of sexual crimes, but the chances are that its supposed effects arise less from any aphrodisiac qualities than from the opportunities afforded when parties of both sexes go out from the villages to gather the ripe fruit.

Of smaller plants the most common and notable were the following, almost all of which are highly characteristic of this region: *Alhagi maurorum*, the (*Shutur khār*, Persian) camel-thorn (a name often erroneously applied to the *Zizyphus*); *Crotalaria burhia*, a plant with a remarkably tough fibrous bark, which might possibly be of use as a textile material; *Ærua javanica*; *Solanum nigrum*; *Convolvulus pluricaulis*; *Microhynchus nudicaulis*; *Carthamus oxyacantha* (nearly related to the Safflower, and itself, as I was told, cultivated for a dye to the south of this); *Rumex acutus* and *Polygonum aviculare*; with abundance of five or six species of *Salsolaceæ*. The last (with the *Tamarix*) here as elsewhere affect a saline soil, and from them, under the name of *lānā*, an impure alkali (*sajjī mattī*) is prepared in immense quantities in various parts of the Punjāb. Of this family I have in all got twelve species on this frontier, but Griffith collected more than double this number in Affghanistān, and they appear to culminate in number and variety in Southern Siberia and on the Kirghiz Steppes.

The commonest grasses were *Cynodon dactylon*, *Eleusine gallifera*, *Andropogon Bladhii*, and a *Cenchrus*.

These, the ordinary plants about Tāk, do not differ from those we had had most of the way from Peshawur. Most of them are common at the latter places, and except *Crotalaria burhia* there is not one I have not got within 20 miles of it.

The only novelties I got here were two *Asclepiads*, neither of them in flower, but probably a *Pentatropis* and a *Cynanchum*.

The country round Tāk is a nearly level plain, and the soil mostly of clay, in horizontal strata, but slightly cut up by ravines, and on the sides of these sand and gravel occasionally appear. The only large ravine is one which runs along to the south side of the city. It is very marshy, and has (with other marsh-plants) an abundance of *Typha angustifolia* (*gond* Hī., *dīb* Pī., *rūkh* Pū.), the leaves of which I noticed to be used as thatch in the city, as they are in many other localities.

Not far from Tāk I had got two novelties, connecting the vegetation of two very different regions, viz., *Neurada procumbens*, a member of the flora of Arabia and Sinde, and a *Calligonum* (probably undescribed), which genus is common in Mongolia. Both of these were abundant within a space of a few miles, but I found neither of them elsewhere.

In the city itself, besides the ordinary mulberry-trees, &c., I observed a few trees of *pīpal* (*Ficus religiosa*), and *Acacia arabica* was abundant, although not seen to the north of this. *Cannabis sativa* is a common weed in the extensive gardens to the north of the city, and I saw one patch of the pilose variety of *Cichorium intybus* (*kāsul* Hī.) cultivated for the *pansāris* (drug-vendors), who sell the seeds of it as a "warm" medicine.

On April 17th we marched from Tāk, and after a gentle rise of some miles entered the eastern edge of the hill-country by the channel of the Zām (probably a generic term for a small river, as there is at least one other Zām, a few miles to the south), up which lies the main road to Kānigoorum, the central city of the Mahsood country.

This ravine is at first in most places a wide and easy one, with occasional masses of *Tamarix*, *Typha*, *Equisetum debile*, &c. It has been formed by the stream in the course of ages cutting through the alternating beds of sandstone and conglomerate which constitute the whole rock here, and which generally dip towards the south-east at varying angles. These rocks, as Professor Oldham informs me, probably belong to the same section of the Tertiaries as the Siwālik or Sub-Himalayan series and parts of the Salt Range.

Here the *Acacia modesta* (*phulāhī* Pī., *pulosa* Pū.) was in full flower and perfume, with *Capparis aphylla* and *Salvadora* not uncommon; also *Grewia betulæfolia*, which is called by the Kohātīs *Shikhāri mewa*—it is difficult to see why, as he would be a hungry hunter indeed who would be tempted by its miserable little fruit.

A tall *Aristida* was abundant in the bed of the stream, and a small *Andropogon* I had not previously got.

We encamped at Khāgī Zīārūt on a lofty plateau of horizontal beds of shingle, which here bordered the Zām ravine. Most of the rock in the neighbourhood was conglomerate, generally in horizontal strata, but occasionally bent in a remarkable way, especially to the south-east of camp, at a narrow gorge through which the stream passed.

Our march of April 18th carried us 10 miles farther up the Zām. Above Khīrgī groves of *Vitex negundo* (*shamālū* Hī., *marivande* Pū.) were frequent along the edges of the ravine; and *Cocculus Leeba*, a common Punjab plant, hung abundantly from the cliffs on either side; while *Dalbergia sissoo* got more common, one or two date-palms were occasionally seen, and *Calotropis procera* (*spulmei* Pū.) became frequent in the shingly bed of the ravine. *Acacia modesta*, *Capparis aphylla*, and *Salvadora* continued. *Peganum harmala* (*spelane* Pū.), a plant common from Delhi to Peshawur, and into Affghānistān, was frequent, with

Centaurea calcitrapa, *Cousinia calcitrapæformis*, and *Carthamus oxyacantha*. *Malcolmia africana* and a *Plantago* with broad sericeous leaves (*P. eriantha*?) were also common.

Three tall grasses were abundant—an *Arundo*, a *Saccharum*, and the *Aristida*—as well as *Alopecurus pratensis*, *Polypogon monspeliensis*, and *Cymbopogon iwarancusa*; the last, however, here almost destitute of the peculiar turpentine odour, whence it derives its name of “lemon-grass.”

The geology of the day's march was similar to that of the 17th; the generally wide shingly bed of the stream being flanked by low hills, composed of conglomerate and soft sandstone, in alternating beds, dipping mostly towards the north-west, at varying and generally low angles. Here also, as on the previous day, part of the river-valley (if so it may be called) was often filled up by horizontal beds of shingle—generally to the height of 50 or 60 feet—which formed plateaux from a few yards to many acres in extent; these are called *ragzhas* by the natives.

At the place of our new camp, *Palosin* (probably derived from *palosa*, the Pushtū name for the *Acacia modesta*, according to a practice common with Affghāns, as among other nations), the country opened out considerably; i.e., the higher hills retired to some distance from the stream, the plateaux on either side were of greater extent than usual, and close to the bed of the *Zām* was a low flat of alluvial deposit, under cultivation, and sufficiently large for the force to encamp on.

On the west side of the stream (here running in a southerly direction) there was one place well supplied with moisture from canals, with a grove of *Dalbergiæ* and *Morus*; and under the trees a number of the smaller spring-plants were still preserved from desiccation by the shade and damp. Of these *Trigonella incisa* was profuse, and there were still a few tufts of *Arnebia echiioides*. One of those plants is interesting, from just extending from the “Oriental” district into our Indian possessions; it is common trans-Indus, and I have found it as far east as the Hurroo, near Hussan Abdāl. It has a very agreeable odour and a pretty yellow corolla, with five dark purple spots on it, which pious Mussulmāns assert to be the marks of Mahomed's fingers. Hence they call it *Paighambari-phūl* (Prophet's flower), and hold it in high favour.

Another interesting plant common here was the *Withania coagulans* of Affghanistān and Sindh, which extends at least as far east as Jhelum, and is abundant in our trans-Indus territory. It is the *puntri* or *punir-bād* (cheese-herb) of Affghāns, so called from being used in some places (e.g. at Candahār, as Dr. Bellew informs me) as rennet. It is not, however, applied to this purpose about Peshawur, but is there used as a stomachic. It is curious that Dr.

Livingstone alludes to a plant of the same family (Solanaceæ), which in some parts of Central Africa is used for a like purpose (coagulating milk), and has a name of similar signification.

Forskählia tenacissima, another Western plant extending a short way into India, was pretty common on cliffs; while Salsolaceous plants were much more rare than in the saline Tak plain.

As about this time a transition occurs in the geological formation of the district, and the flora also soon after this become different, it was fortunate for my purpose that the part of the force to which I was attached remained encamped, near Palosin, for twelve days, so that I had full time to botanise, &c., in the neighbourhood.

Although the hills around were almost as bare of soil as those we had passed, yet there was more verdure on the former, as well as near the banks of the stream and the numerous irrigation-canals. Some of the latter were works of great labour, one I remarked being carried for at least 2 miles along the side of a hill; but as the surface was of loose shaly limestone, and the plateaux to which the canal went was quite barren, I presume that, after their Sisyphean labour, the Wuzerees had found that all the water disappeared long ere it reached its destination.

The ordinary shrubs were *Acacia modesta*, *Zizyphus jujuba*, *Capparis aphylla*, *C. spinosa*, *Abutilon indicum*, and a small *Taverniera*, with pretty pink flowers. One or two climbing *Asclepiads* occurred; and *Periploca aphylla* (*barrarra* Pū.), an almost leafless erect one, was common, as in many places along the frontier.

Of smaller plants there were the following (besides many previously got):—a pilose *Erodium*, a *Polygala*, *Convolvulus pluricaulis* (which is esteemed by the Punjābis as a "cooling" vegetable), a large odorous *Salvia*, *Boerhaavia procumbens*, and another *B.*, *Allium leptophyllum*, *Rumex vesicaria*, and *Portulaca quadrifida* (also held to be medicinal by the Punjābis).

The common grasses were, *Andropogon Gryllus*, *Cymbopogon iwarancusa*, *Eragrostis cynosuroides*, *Eleusine flagellifera*, a *Chloris* (*C. villosa*?), *Heteropogon contortus*, *Aristida setacea*, a species of *Melica*, *Pennisetum cenchroides*, *Imperata Kœnigii*, and *Cynodon dactylon*. The two last grow only when the ground is at least periodically moistened; while all the others flourish where there is no moisture and but little soil.*

Among the more notable plants were a species of *Cometes*; a shrubby spinous *Astragalus*, with yellow flowers (hence called *zare*, golden, in Pushtū); a Rubiaceous plant, with a scarious perianth,

* *Cynodon* and various species of *Pennisetum* are, in the Punjāb, reckoned good for milk as pasture.

and, when bruised, a most vile odour; a small half-shrubby spinescent *Convolvulus*, and two shrubby *Rhamni*.

Tecoma undulata (*ichārū* Hi., *regdāwan* Pū.), with its splendid orange flowers, was common; as was a species of *Caralluma* or *Boucerosia*, which affects dry rocky places along the frontier, and as far east in the Himalaya as Rajaori. Its tetragonal leafless stems are intensely bitter, and are regarded as stomachic by both Pathāns and Punjābis. Its Persian name, *Panj-angusht* (five fingers), is descriptive of its appearance.

On April 26th, we moved camp fully a mile farther up the stream.

The change in the geology, to which I have alluded, was of this nature. Below Palosin, the whole of the rocks seen *in situ* had been conglomerate or soft sandstone, probably contemporaneous with the strata of the outer Siwāliks; but immediately above our first camp at Palosin, limestone began to appear, frequently in the form of isolated knife-like ridges of 60 or 70 feet high, the jagged edges of the nearly vertical strata rising high in the air, and presenting a curious appearance. The most conspicuous of these sub-erect ridges were of a cherty, whitish, non-fossiliferous limestone. Besides this there were a greyish hard limestone, a soft, white, chalky limestone, both without fossils; and in some places nummulitic beds, almost wholly composed of shells, mostly small, and apparently of only two or three different species. This last rock was best seen in a ridge between our first and second camps; and on the upper (western) slope of the strata was a deposit of tons of the nummulites, caused by the disintegration of the binding portion of the rock, and called *paisa*, i.e., coins, by the natives of districts where they occur. Along with these were strata of earthy shaly limestone, and there were numerous beds of decomposing parti-coloured marls, containing a good deal of salt (as evidenced by the efflorescence on their surface). These, by exposure to the air, were reduced to mounds of dark-coloured dirt, simulating the ash-heaps of some Cyclopean smithy.

Another noticeable feature here was the occurrence of numerous masses of limestone, from an inch to a foot or two in diameter, apparently entirely composed of corallines and allied forms. These were nowhere found *in situ*, but lying detached among and upon mounds of *débris* of various rocks, and scattered over the valleys between the limestone ridges. In some cases I found the impressions of similar corallines on the surface of the more vitrified non-fossiliferous limestone.

About half-a-mile above our new camp there was a small grove of *Populus euphratica*, with its curiously diverse-shaped leaves. Here it was rather stunted, but on the first Expedition we had met with some fine trees.

On May 1st I was enabled to make a short excursion of 3 or 4 miles among the hills to the northward with the survey party, and found one or two novelties, such as an *Edwardsia*, with fine yellow flowers, and a few shrubs of *Boswellia* (?). Here also, in addition to the shrubs I have formerly noted, *Reptonia buxifolia* (*goorgoora* Pū.) was common, as in many places along the frontier.

On May 2nd we made a short march of 4 miles up the Zām, passing through a continuation of strata similar to those at Palosin.

Here were a few plants of *Eremostachys laciniata*, which is occasionally trans-Indus, and *Acacia jacquemonti* became more common than it had previously been.

On May 3rd, towards the end of our march of $4\frac{1}{2}$ miles, the hills began to be better covered with the usual shrubs, and there were along the banks of the stream numerous fine trees of *Morus*, *Populus alba*, and *Salix babylonica*.

The rocks were similar to those of the preceding day, various limestones, with occasional beds of the disintegrating, parti-coloured, marly shells; and just above camp the ravine was narrowed into a gorge (the *Tungāt*, or Pass of Anāi) by a ridge of limestone, hard, grey, and non-fossiliferous, rising to 150 or 200 feet above the stream, the strike of the strata being S.W. and N.E., with a moderate dip to the N.W.

By our camp were some finer olive-trees (*Olea europea*, *kāū* Pī, *khucan* Pū.) than we had before met with. This is one of the common trees on all the lower hills I have visited on this frontier, and its well-known hard wood is useful for many purposes.

In the ravines of a hill close by Anāi, I found abundance of a species of *Sageretia* (undescribed?), the fruit of which is very pleasant; and, with that of some other species of the same genus, is called *Mūmāni* by the Affghāns.

Dodonaea Burmanniana, and a spinous *Celastrus* (both common along the frontier), with the *Olea* and *Reptonia*, constituted most of the shrubby vegetation of the hills here.

It is curious enough that up to near this point the five plants last mentioned had not been seen; and I remarked a similar infrequency of all of them in the Bahadurkheyl branch of the trans-Indus Salt Range. Their absence can hardly be accounted for by aridity, as I have found all in situations quite as dry as either of these; but it may depend either on the saline constituents of the soil in both these situations, or on the nature of the rock, which, where these shrubs are common, is limestone or slate; while where I have remarked their absence, it has been sandstone and conglomerate.

On May 4th we moved 8 miles up the Zām; but as the fight at the *Barrarra* Pass occurred in the course of this march, I was

hardly able to devote the same attention to plants as would have been given to them had our progress been unopposed.

Just after passing through the Anāi Gorge, the ravine of the Zām became considerably narrower than it had previously been, being enclosed by high cliffs of greyish limestone, overlying, unconformably, strata of the parti-coloured shales. The plateaux of horizontally deposited shingle, frequently skirting the stream, also became much higher, being sometimes as much as 150 feet above its bed.

The flora now began to change somewhat. One or two peach-trees occasionally occurred, and a second fern (*Pteris longifolia*) made its appearance; the only fern hitherto seen having been *Adiantum capillus veneris*, which is common at damp shady places all along the frontier. I also saw in the bed of the stream one or two cones of *Pinus longifolia*.

On the hills, *Chamærops Ritchiana* (*mazare Pū.*) was now abundant. It is possibly identical with *C. humilis*, the only European palm, and is common on the lower hills of Affghanistān and this frontier, above 1500 feet. The farthest east that I know of its being found is Sarkesar, one of the higher and central hills of the cis-Indus Salt Range. Its leaves are used for making ropes, mats, sandals, &c.; and the reddish mossy-looking hair found in the axils of the petioles is used by the Pathāns for touch-paper.

At the Pass where the enemy "stood," the Zām had cut its way through a ridge of the grey, non-fossiliferous limestone; and beyond this point the ravine, in which our road lay, was much more confined than hitherto by the rugged heights to the right and left. The character of the vegetation also became still more altered, as we had now reached a height of nearly 4000 feet above the sea.

Daphne oleoides and *Buxus sempervivens* were common, as well as *Sageretia* and *Olea*; while a bramble (*Rubus fruticosus*), not uncommon on the frontier, hung in masses from the cliffs. An oak also (probably *Quercus ilex*) was met with on the heights, while just at the Barrarra Pass a few wild trees of *Punica granatum* were in flower. An unflowered *Mentha* (probably *M. incana*) was abundant at wet places, as well as *Ranunculus laetus*; *Fragaria indicu* occurred, and *Gardenia tetrasperma* was not uncommon.

Close by our new camp at Bungī Wāla (probably nearly 4500 feet above the sea) was a fine jungle of *Vitex*, *Celtis nepalensis* (?), &c., with abundance of *Eremostachys*, and a number of the small vernal *Cruciferae*, *Caryophyllaceae*, &c.

On May 5th we marched 15 miles to reach Kanigoorum, the penetrale of the Wuzeer country, and encamped at 6500 feet above the sea.

During this march the hills were mostly composed of thin-bedded calcareous shales, in one part especially covered with obscure impressions of Algæ (?), and often alternating with quartzite in thick beds, which were frequently much contorted. The dip was generally towards the north-west, at about an angle of 45° . The high masses of shingle were still common along the skirts of the ravine of the stream, but their composition had changed greatly since Palosīn. Here the pebbles were mostly of schistose limestone and granite-rock, both of which, especially the latter, had been infrequent below and to some distance above that place.

During the latter part of the march, almost all of the semi-arboreous vegetation of the rounded hills above which we were gradually rising consisted of two oaks, *Quercus ilex* and *Quercus laxiflora* (?), the former being much the more common.

Morus, *Populus*, and *Salix* continued near the bed of the stream, but *Dalbergia* ceased below this.

The more noteworthy plants, of about forty species, which I had not previously got on this trip, were the following: Apricot, occasional; Peach, at one or two places; *Cotoneaster rotundifolia*, common; a shrubby *Cratægus* (?), forming a striking object with its masses of white blossoms; *Spiræa Lindleyana*, abundant; *Buddlæa crispa*, frequent; *Jasminum revolutum*, occasional; *Abelia triflora*, with pretty pink blossoms and a delicious perfume, common; *Berberis lycium* and *Clematis grata*. Two spinous *Astragali* were abundant latterly, both new to me, and probably Affghan forms; *Scutellaria linearis*, *Ajuga parviflora*, *Phagnalon denticulatum*, a second species of *Cousinia*, a small *Valerianella*, a *Valeriana*, and *Saxifraga ligulata* occurred. *Centaurea calcitrapa* accompanied us all the way, as well as the tall *Aristida*; and *Chloris*, a form of *Polygonum aviculare*, was profuse at our camp; and a species of *Thymus* quite carpeted the ground and perfumed the air in some places.

On May 7th I accompanied the survey party to the top of a hill called Bar Pit, about 6 miles to the s.s.w. of our camp; and, as it was 1700 feet higher than the latter (indeed, the greatest elevation we reached during the expedition), I got a number of plants that I had not previously met with.

During part of the ascent *Berberis* was common and the *Buddlæa* abundant; with a second species of *Celtis* (*C. caucasica*), *Edwardsia*, *Spiræa Lindleyana*, *Rubus*, and Apricot. These, however, we left behind with the brook up the bed of which our road lay for a short way.

Higher up, the two oaks constituted the mass of the wood to the top of the hill, and the following were more or less common. A second *Clematis*, *Jasminum officinale*, *Lonicera quinquelocularis*,

Abelia, *Viburnum cotinifolium*, *Cotoneaster vulgaris* (?), *Cratægus*, and *Indigofera*, and one or two plants of a *Syringa* were met with.

Near the Kanigoorum brook, *Plantago major* was common, as well as *Oxalis corniculata*, *Trifolium repens*, *Malva parviflora*, *Mentha incana*, *Adiantum capillus veneris*, and *Barbarea vulgaris*; all, except the last, not uncommon on the plains along the frontier.

Higher up on the hill were found *Taraxacum officinale*, *Thymus*, *Scutellaria*, *Morina Wallichiana*, *Scabiosa succisa*, *Serratula pallida*, one or two spinescent *Astragali*, several *Labiatae*, *Androsace incisa*, *Valeriana*, *Fragaria vesca*, a *Viola*, *Trigonella Emodi*, and *Polygala elegans*.

The only parasitic plant was *Viscum album*, which was abundant on oaks near Kanigoorum village; and the only orchid was *Cephalanthera ensifolia*, which was common half-way up the hill, and has now been found in many places from the farthest east to the extreme west of British India.

It was rather a disappointment to me to find that on this hill there were no pines, although they were plainly visible at a height somewhat above this some few miles off on the magnificent Peer Ghul, which here represents the centre of the Suleiman Range.

Most of the strata of Bar Pit appeared to be of calcareous schists and quartzite, generally dipping towards the north-west at a high angle. This hill, being higher than most of the others near it (except the Peer Ghul and its congeners, which towered some 3000 feet above us), commanded an extensive view: and it could be seen that although the various ridges of the hill-mass through which we had come, and which lay stretched below us to the eastward, were disposed rather irregularly, yet there was a general tendency to a north and south direction; and the usual strike of the strata, as observed on the way to and from Kanigoorum from below, corresponded with this.

On May 9th we marched 8 miles down the stream by the same route as we had gone up, so that there was but little novelty for me. About half-way, however, I found *Rubia cordifolia* pretty common,—the only time I have ever got it trans-Indus. There were also at one place in the bed of the stream a few plants of a *Poterium*. I also found several bushes of a white-flowered *Rosa*, and *Veronica biloba* were abundant in some fields.

On May 10th we marched from Dobōi, at about 5000 feet above the sea, and leaving our upward road moved to the northward up a feeder of the Zām.

Olea and *Quercus* were both very common, with *Viscum* frequent on the former; *Vitex* occurred in damp places; the *Rosa*

of the 9th was occasional, and *Erodium cicutarium* and *Chenopodium botrys* (both common plants of the plains on the frontier) were abundant.

The rocks were mostly similar to those passed through on the 9th; and in some places irrigation canals had been, with immense labour, tunnelled through the schistose ridges.

Our new camp of Tandachina was on a wide shingle plateau, where a pink-flowered spinous *Astragalus* and the *Kāneegoorum Cousinia* were abundant. Shrubs were few and small, and consisted of *Cotoneaster rotundifolia*, *Olea*, *Berberis*, *Edwardsia*, and *Daphne oleoides*. The commonest grass was the *Chloris*, which appears to delight in the most arid situations.

Here a puzzling root was brought to me by an Afreedee sepoy. It is called in Pushtū *kwerei*, and the specimen I got was of a yellow colour, hard and woody, about an inch in diameter, with a strong but not disagreeable bitter taste. It is said to be abundant in Teerah (a district in the hills south-west of Peshawur), where it is much valued as a stomachic. As I did not find the plant, I presume it had not then sprung up, but, from the description, it is probably a thorny *Smilax*.

On May 11th I had an opportunity of accompanying up one of the spurs of Peer Ghul a regiment which was to aid in covering the operation of destroying the collection of villages known by the name of Makeen, which lay around a small fertile basin watered by a brook, and enclosed by that and another spur.

The ridge we ascended was several hundred feet higher than the camp-plateau, and had a scanty shrubby vegetation of *Quercus*, *Berberis*, *Edwardsia*, &c. There were two or three trees of *Juglans regia* near a hamlet, and a small unflowered *Impatiens* was abundant by a low brook.

The ridge was covered with shingle, frequently granitic, with occasional blocks of grit, showing evidence of contact with trap, and but rarely could a sight be got of the bluish schistose grits *in situ*, in strata dipping at a very high angle to the eastward. This was the nearest I got to the Peer Ghul mass, the strata of which—so far as could be made out from a distance—appeared to have a similar dip and direction.

On May 12th we marched about 8 miles to Ruzmuk, still in a northerly direction up the bed of the stream we had followed two days before. The more notable plants were the following:—*Cotoneaster*; *Berberis*; *Amygdalus persica*; a species of *Berchemia* (undescribed?) that I had previously found in Huzārā; an *Urtica* (*U. urens*? called by Affghans *sayankhāi*, "the stinger"); *Blitum virgatum*; *Peganum* and *Verbascum Thapsus*. A creeping convolvulus, with very white silky leaves, abounded in fields latterly,

and a very pilose form of *Ceratocephalus falcatus* was profuse in one small patch.

Just before reaching our new camp we passed an extensive mass of the thin-bedded bluish calcareous shale, covered with vegetable impressions, which we had before seen above Bungī Wālā. Here it was overlying the strata of a ridge of grit, both being highly inclined to the west.

Our road lay up the ravine which the brook had cut through among sloping beds of shingle, which filled up the lower part of the space between the higher hills to the right and left, and there was a considerable ascent till we reached our camp, which was the highest (7000 feet above the sea) we had during the expedition.

On May 13th we halted, and I took a short stroll round by a hill to the east of camp, where was abundance of many of the common spring-plants of the frontier, besides a second *Delphinium* (*D. camptocarpum*?) and a fine red thistle (*Carduus nutans*), which was greedily eaten by the camels, who had hardly left me a single specimen worth taking. Here also I found *Diplopappus molliusculus*, *Thlaspi arvense*, and in one place a profusion of *Hyoscyamus niger*.

On May 14th our march was a short one of 5 miles to the north-east.

For the first mile and a half we continued to ascend the bed of the stream as before, but then crossing a minor watershed, we made a very rapid descent the rest of the way, in a rough precipitous gorge, among limestone and calcareous shale generally dipping to the eastward at a high angle, and occasionally much bent. Down this gorge ran a small brook, the commencement of the Khyssore, which debouches on the plain a few miles to the south of Bunnoo, and the easterly course of which we afterwards followed for five days till we issued from the hills.

Besides the shrubs of the preceding two days, *Viburnum cotinifolium*, *Cratægus*, and *Buddlæa* were common, and *Sageretia*, and *Reptonia*, which had not been seen for some time, again appeared, thus indicating a considerable descent.

The only novelty was an *Acanthophyllum*, of which a few prickly clumps were found near the level spot on which we encamped. To reach the latter, we ascended from the stream to the right (east) over the edges of strata of ferruginous grit, dipping at a very high angle to the north-east.

The district about Kānigoorum has long been noted for its iron, of which large quantities are in the cold season brought into Bunnoo at the weekly market, and for several days rude furnaces with large collections of clay-ironstone and slag-heaps had frequently been seen by our troops in the villages, but nowhere

previously had I remarked any place so likely to be near the ore *in situ* as this. My attempts to get a guide, &c., in order to visit the mines were unsuccessful; but the process of mining I understood (from Wuzeer information) to consist of simply following the outcropping ferruginous strata, by scraping off the superincumbent non-metalliferous rock, in places where both have generally a steep slope.

On May 15th we marched 15 miles down the Khyssore, passing groves of fine olive-trees on our way from Razānī, where we had been encamped.

The strata shown in section in the ravine were mostly of calcareous schist, similar to those on the Zām above Bungī Wālā, generally dipping steeply towards the west, and often with thick horizontal beds of shingle overlying them.

The plants were as follows:—*Quercus ilex*, getting rare as we descended, *Rhamnus virgatus*, *Acacia modesta*, *Celastrus*, *Chamaerops*, *Periploca*, and *Ephedra*, all becoming common, and none of which had been found above this; also *Andrachne telephioides*, *Heliotropium ramosissimum*, *Boerhaavia procumbens*, and *Solanum Jacquinii* reappeared during this march.

A fœtid white tomentose Labiate (*Salvia lanata*?) was common most of the way, with *Vebasum*, *Peganum*, and the *Kāneegoorum Cousinia*.

Of grasses, the tall *Aristida* was abundant, with *A. setacea*, *Cymbopogon iwarancusa*, *Eragrostis cynosuroides*, and a tall *Saccharum*, and I found one or two tufts of an *Ægilops*.

Linaria cabulica was occasional on the cliffs (although *L. ramosissima* had been the common form in this district as along the frontier generally), and an unflowered species of *Statice*, with one or two plants of a *Dianthus*, occurred.

About midway there grew on the rocks abundance of a *Lycium* (?), but much too young for determination, and I found in fruit a few trees of a *Pistacia* (I think *P. terebinthus*), called in Pushtū *shnee*. Griffiths supposed a noted Affghan plant called by this name to have been a *Xanthoxylon*, but it is more likely to have been a *Pistacia*.

The *Acanthophyllum* of the 14th was common at our camp of Siroba, near which *Reptonia*, *Acacia modesta*, and *Olea* were the predominant shrubs.

On May 16th we marched 11 miles down the stream to Dawa Waka. *Morus*, *Populus*, and *Salix* were now common along the banks, although the preceding day neither of the two former were seen; small *Tamarix* occurred, and *Tecoma*, *Dodonaea*, *Punica granatum*, *Vitex*, and *Cocculus Leaebe* abounded. The following plants likewise reappeared or became common:—*Achyranthes*

aspera, *Aploaxis candicans*, *Lactuca auriculata*, *Centaurea calcitrapa*, *Cirsium arvense*, *Calotropis procera*, *Lycopus europæus*, *Eremostachys*, *Salvia pumila*, *Plantago lanceolata*, *Verbena officinalis*, *Samolus Valerandi*, *Capparis spinosa*, *Eriophorum comosum*, and *Typha angustifolia*. Plants of a *Cucumis* also (*C. pseudo-colocynthis*?), not uncommon along the frontier, and often met with in the lower part of the Zām, here reappeared, as did *Ærua javanica*.

The rocks seen *in situ* were mostly calcareous shale, and their dip was to the north-west, almost at right angles to that of the strata passed through on the previous day.

We halted a day at Dawa Warka, which is probably about 3000 feet above the sea.

On May 18th we marched 10 miles down the Khyssore to Speenwām, and on the way passed through a tract geologically similar to that about Palosin, with ridges of various limestones in highly inclined strata, heaps of decomposing parti-coloured shales, and blocks of the coralline and nummulitic limestone scattered about. We then entered upon the sandstone and conglomerate district, thus almost exactly taking in reverse the rocks we had met with in ascending the Zām. Both the sandstone and nummulitic districts, however, appeared here to be of much smaller extent from east to west than on the lower Zām.

We had now almost got into the plains; the crops were ripe, the *Vitex* in flower, and *Capparis aphylla*, *Zizyphus jujuba*, and the other ordinary frontier-plants, were abundant.

On May 19th the first mile and a half of the march carried us quite out from between the low sandstone hills among which we had been encamped, and into the plain of Bunnoo, which place we reached on the following day.

In reviewing shortly the vegetation of the country passed through, I find that it may be conveniently divided into two zones or regions. The outer (lower) of these would comprise the Zām from the plains up to Anāi, and the Khyssore up to above Dawa Warka, *i. e.*, from about 1000 to 3500 feet above the sea; and the upper one, nearer the centre of the mountain range, would include all the country visited by us above these two places, *i. e.*, from 3500 to 8300 feet above the sea, comprehending the upper Zām and some of its tributaries, the hills near Kāneegoorum, and northward to below the Ruymuk Pass.

I shall proceed as concisely as possible and at the risk of much repetition to enumerate, so far as they have been identified, the chief plants observed in each of these zones, beginning with the former.

Of trees there are none, if we except the four or five species

(*Salix*, *Populus*, *Morus*, *Dalbergia*, and *Ficus*) which, although common along the banks of streams, are, if not introduced, at least fostered and spread by the aid of man.

The principal indigenous shrubs and climbers are mostly the same as those ordinarily found on the lower dry hills of this frontier, and are as follows:—*Cocculus laeba*; *Capparis aphylla* and *C. spinosa*; *Abutilon indicum*, *Sida humilis*; *Melhania abutiloides*; *Grewia betulæfolia*; *Dodonæa Burmanniana*; *Celastrus*; *Zizyphus jujuba*, *Rhamnus virgatus*, *Sageretia* (n. sp.); *Rhus acuminata*; *Acacia modesta*, *A. farnesiana*, *Dalbergia sissoo*, *Edwardsia*, *Crotalaria*, *Taverniera*, and four spinous shrubby *Astragali*; *Tamarix dioica*; *Reptonia buxifolia*; *Olea europæa*; *Tecoma undulata*; a spinous half-shrubby *Convolvulus*; *Ehretia aspera*; *Adhatoda vasica*; *Vitex negundo*, *Lantana alba* (?); *Salvadora*; *Populus alba*, *P. euphratica*, *Salix babylonica*; *Celtis nepalensis*; *Ficus caricoides*; *Ephedra*; and *Chamærops Ritchiana*.

The herbaceous vegetation found in this region, like the ordinary spring-herbs of the Punjab and North-West Provinces, shows a striking resemblance to that of Europe; indeed the genera and even the species are in many cases identical with those of Britain, as will at once be seen from the following list:—*Ranunculus arvensis*, *R. sceleratus*, *R. muricatus*, *R. aquatilis*, *Adonis æstivalis*, *Delphinium penicillatum*; *Papaver cornigerum*, *P. lævigatum*, *P. dubium*; *Fumaria parviflora*; *Goldbachia lævigata*, *Sisymbrium irio*, *Malcolmia africana*, *M. sp.*, *Notoceras sp.*, and three other *Cruciferae* (we were, however, too late for many of this family, the plants of which in this part of India generally precede those of most others in spring); *Oligomeris glaucescens*; *Cleome ruta*, *C. linearis*, *C. sp.*; *Viola*; *Polygala sp.*; *Silene leysseroides*, *Cerastium viscosum*; *Linum strictum*; *Euphorbia hypericifolia*, *E. thymifolia*, *Andrachne telephioides*, *Crozophora tinctoria*; *Malva parviflora*, *M. sylvestris*; *Corchorus trilocularis*; *Erodium sp.*; *Oxalis corniculata*; *Fagonia cretica*, *Peganum harmala*, *Tribulus terrestris*; *Trigonella incisa*, *Melilotus parviflora*, *Medicago maculata*, *M. denticulata*, *Lathyrus aphaca*, *Astragalus sp.*; and three other *Leguminosæ*; *Potentilla supina*; *Cucumis sp.*; *Portulaca quadrifida*; *Spergularia rubra*, *S. marina*, *Cometes sp.*; *Orygia trianthemoides*; *Psammogeton biternatum*, *Pimpinella sp.*; *Bunium sp.*; and four other *Umbelliferae*; *Galium aparine*; *Scabiosa Olivieri*; eighteen species of *Compositæ*, including *Artemisia elegans*, *Berthelotia lanceolata*, *Trichogyne cauliflora*, *Lactuca auriculata*, *Aplotaxis candicans*, *Cousinia calcitrapæformis*, *Centaurea calcitrapa*, *Microrhynchus nudicaulis*, *Sonchus arvensis*, *Eclipta erecta*, *Filago germanica*, *Scorzonera*, n. sp. (?), *Blumea sp.*, and *Echinops sp.*; *Samolus Valerandi*, *Anagallis arvensis*;

Rhazya stricta; *Periploca aphylla*, *Orthanthera viminea*, *Pentstemon microphylla*, *Boucerosia* sp., and two other *Asclepiadaceæ*; *Convolvulus pluricaulis*, *C. arvensis*; *Heliotropium europæum*, *H. brevifolium*, *H. ramosissimum*, *Arnebia echioides*, *Lycopsis arvensis*, *Cynoglossum* sp., and *Asperugo* (?); *Withania somnifera*, *W. coagulans*, *Solanum nigrum*, *S. Jacquini*, *S. gracilipes* (?), *Scopolia præalta* (?); *Linaria ramosissima*, *L. cabulica*, *L. sp.*; *Veronica agrestis*, *V. anagallis*, *Herpestis monniera*; *Dicliptera Roxburghiana* (?); *Verbena officinalis*, *Lippia nodiflora*; seven *Labiata*, including *Lycopus europæus*, *Lallemantia Royleana*, *Salvia pumila*, and *S. sp.*; *Plantago major*, *P. lanceolata*, *P. bauphula*, *P. eriantha* (?), and other two *Plantagos*; twelve species of *Salsolaceæ*, including *Panderia pilosa*, *Atriplex laciniata*, *Salsola kali*, *Anabasis multiflora*, *Caroxylon foetidum*, *G. Griffithii*, *Chenopodium album*, *C. hybridum*, and *Halocharis* sp.; *Pupalia lappacea*, *Achyranthes aspera*, *Ærua javanica*; *Boerhaavia procumbens*, *B. repanda* (?), and *B. sp.*; *Polygonum barbatum*, *Rume vesicaria*; *Thymelæa arvensis*; *Forskalea tenacissima*; *Allium leptophyllum*, *Asparagus* sp.; *Typha angustifolia*. Of grasses about 40 species, including the following: *Andropogon involutus*, *A. Bladhii*, *A. ischæmum*, *A. sp.*, *Panicum maximum*, and two other species, *Pennisetum cenchroides*, *P. araneosum*, *Aristida setacea*, and two others, *Eragrostis cynosuroides*, and two others, *Heteropogon contortus*, *Digitaria sanguinalis*, *Dactyloctenium ægyptiacum*, *Bromus mollis*, *Eleusine flagellifera*, *Cynodon dactylon*, *Kœhleria cristata*, *K. sp.*; *Imperata Kœnigii*, *Avena fatua*, *Cymbopogon iwarancusa*, *Agrostis alba* and two others, *Phalaris canariensis*, *Chloris* sp., *Lolium temulentum*, *Sporobolus* sp., *Saccharum* sp., *Arundo karka*, *Nardus stricta*, *Rottbollia hirsuta*, two species of *Stipa*, *Polypogon monspeliensis*, and one species each of *Pappophorum*, *Chrysopogon*, *Phleum*, and *Cenchrus*; *Eriophorum comosum*, *Scirpus maritimus*, *Cyperus niveus*, *C. exaltatus*, *C. rotundus*; *Adiantum capillus veneris*; and *Equisetum debile*.

In regard to the second (inner or upper) zone, it is worthy of remark that, although abundance of large forest-trees would have been found even in the most western Himalaya, at heights much under that which we have reached (8000 feet above the sea), yet the largest plants we met with in Wuzeeristān were species of *Quercus*, which in strictness could only be called *sub-arboreous*, being very seldom indeed "more than three times the height of a man." Doubtless numerous pines and other large trees were visible on Peer Ghul, but probably none lower than 9000 feet, and these we cannot take into our estimate, as we did not reach that mountain. This fact of the absence of large trees probably depends in part on the aridity of this tract of country, and in part on the great scarcity of soil over most of it.

The following is a list of the predominant arbusculi, shrubs, and climbers of this region:—

Four species of *Clematis*, including *C. grata* and *C. montana*; *Berberis Lycium*; *Buxus sempervirens*; *Berchemia*, n. sp.; *Sageretia* sp.; *Zizyphus vulgaris*; *Rhus cotinus*, *Pistacia terebinthus*; *Edwardsia mollis*, *Indigofera*, and two spinous *Astragali*; *Cotoneaster vulgaris*, *C. rotundifolia*, *C. sp.*; *Prunus armeniaca*, *Amygdalus persica*, *Spiraea Lindleyana*, *Rubus fruticosus*, *Crataegus*, sp.; *Rosa* sp.; *Punica granatum*; *Lonicera quinquelocularis*, L. sp.; *Viburnum cotinifolium*, *Abelia triflora*; *Gardenia tetrasperma*; *Olea europæa*, *Fraxinus xanthoxyloides*, *Syringa* sp.; *Jasminum revolutum*, *J. officinale*; *Buddæa crispa*; *Daphne oleoides*; *Quercus ilex*; *Q. laxiflora* (?), *Salix babylonica*; *Celtis nepalensis*, *C. caucasica*; *Ficus caricoides*; *Ephedra*. One parasite, *Viscum album*, was common on oak and olive at various places.

The more prominent herbs were as follows:—

Ranunculus lætus, *R. arvensis*, *Delphinium camptocarpum* (?), *Adonis æstivalis*, *Aquilegia vulgaris*, *Thalictrum* sp., *Ceratocephalus falcatus*; *Hypecoum procumbens*, *Fumaria parviflora*; nine species of *Cruciferae*, including *Barbarea vulgaris*, *Thlaspi arvense*, *Neslia paniculata*, *Lepidium draba*, *Arabis arenosa*, *Sisymbrium sophia*, and *Nasturtium* sp.; *Viola serpens*; *Polygala elegans* (?); *Silene conica*, *Stellaria media*, *Cerastium viscosum*, *Acanthophyllum* sp., *Dianthus* sp.; *Euphorbia helioscopia*, *E. sp.*; *Malva parviflora*; *Erodium cicutarium*, *Geranium nepalense*, *G. sp.*; *Impatiens* sp.; *Oxalis corniculata*; *Astragalus tribuloides*, and other four *Astragali*, *Trigonella incisa*, *T. Emodi*, *Vicia sativa*, *V. sp.*; *Medicago lupulina*, *Lotus angustissimus*, *Trifolium repens*, and other five *Leguminosæ*; *Fragaria indica*, *F. vesca*, *Potentilla supina*, and other two species, *Sanguisorba* sp.; *Sedum adenotrichum*; *Saxifraga ligulata*; *Bupleurum marginatum*, *Prangos* sp. (?), and other three *Umbelliferae*; *Rubia cordifolia*, *Galium tricornè* (?), and *G. aparine*; *Scabiosa succisa*; *Morina Wallichiana*, *Valeriana* sp., *Valerianella* sp.; twenty-six species of *Compositæ*, including the following—*Guaphalium multiceps*, *G. sp.*; *Cousinia* sp.; *Phagnalon denticulatum*, *Serratula pallida*, *Diplopappus molliusculus*, *Carduus nutans*, *Cirsium arvense*, *Francoeuria crispa*, *Filago germanica*, *Aplotaxis candicans*, *Taraxacum officinale*, *Cichorium intybus*, *Othonna* sp., *Xanthium strumarium*, *Bidens pinnata*, *Blumea* sp., *Senecio* sp., *Saussurea* sp., and *Artemisia laciniata* (?); two species of *Campanula*; *Androsace incisa*, *Samolus valerandi*; *Vincetoxicum* sp.; *Convolvulus arvensis*, *C. sp.*; *Lithospermum arvense*, *Rochelia stellulata*, *Nonnea Edgeworthii*, *Onosma* sp.; *Hyoscyamus niger*, *Datura stramonium*, *Solanum nigrum*; *Veronica biloba*, *V. agrestis*, *V. anagallis*, *Scrophularia cabulica*, *S. decomposita*,

Verbascum thapsus, *Linaria cabulica*, *Leptorhabdos parviflora*; *Verbena officinalis*; twenty-one species of *Labiatae*, including two of *Mentha*, *Scutellaria linearis*, *S. sp.*, *Ajuga parviflora*, *Thymus sp. (?)*, *Lycopus europæus*, *Lallemantia Royleana*, *Plectranthus rugosus*, *Eremostachys laciniata*, *Marrubium vulgare*, *Phlomis sp.*, *Nepeta raphanorrhiza*, *Salvia glutinosa*, *S. lanata*, and three other *Salviae*; *Statice sp.*; *Plantago major*, *P. lanceolata*; *Chenopodium botrys*, *Blitum virgatum*; *Polygonum aviculare*, *P. flaccidum*; *Cannabis sativa*, *Urtica sp.*; *Alisma plantago*; three species of *Liliaceae*; *Juncus glaucus*, *J. articulatus*; *Cephalanthera ensifolia*; sixteen species of grasses, including *Ægilops sp.*, *Andropogon involutus*, *A. sp.*, *Bromus mollis*, *Dactylis glomerata*, *Chloris sp.*, *Digitaria sanguinalis*, *Sporobolus sp.*, *Hordeum sp.*, *Kœhleria sp.*, two species of *Melica*, *Apluda geniculata*, *Anthistiria sp.*, *Agrostis alba*, and a *Saccharum*; *Cyperus niveus*, *Malacochaete pectinata*, *Fimbristylis sp.*, *Scirpus maritimus*, and three *Carices*; *Adiantum capillus veneris*, *Pteris longifolia*, and *Equisetum debile*.

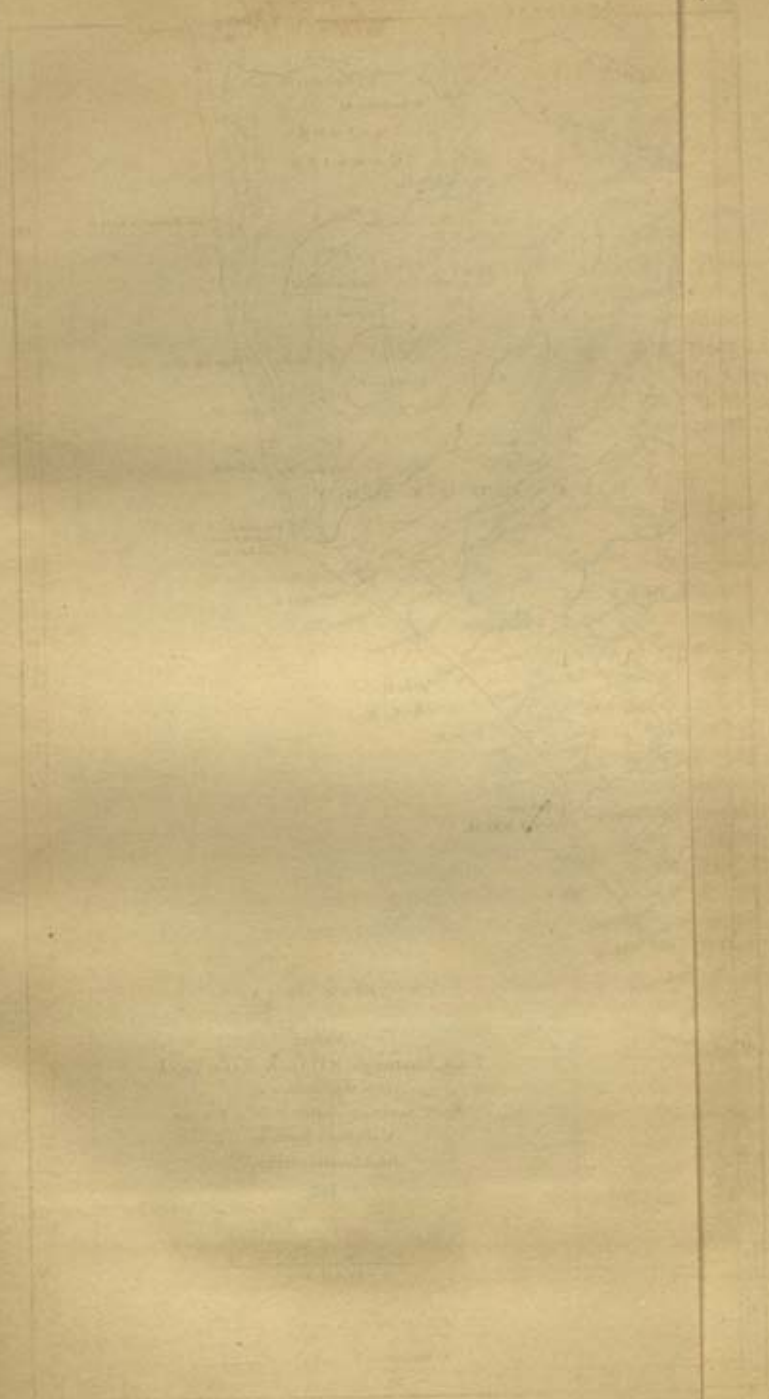
In reviewing the vegetation of this upper district, it is remarkable that most of the shrubs are identical with Himalayan plants, the number of northern and western forms (including *Ephedra* and some of the species of *Quercus*, *Celtis*, and *Rhus*) being very small; whereas of the herbaceous plants, as in the lower zone, a large proportion are western and European species.

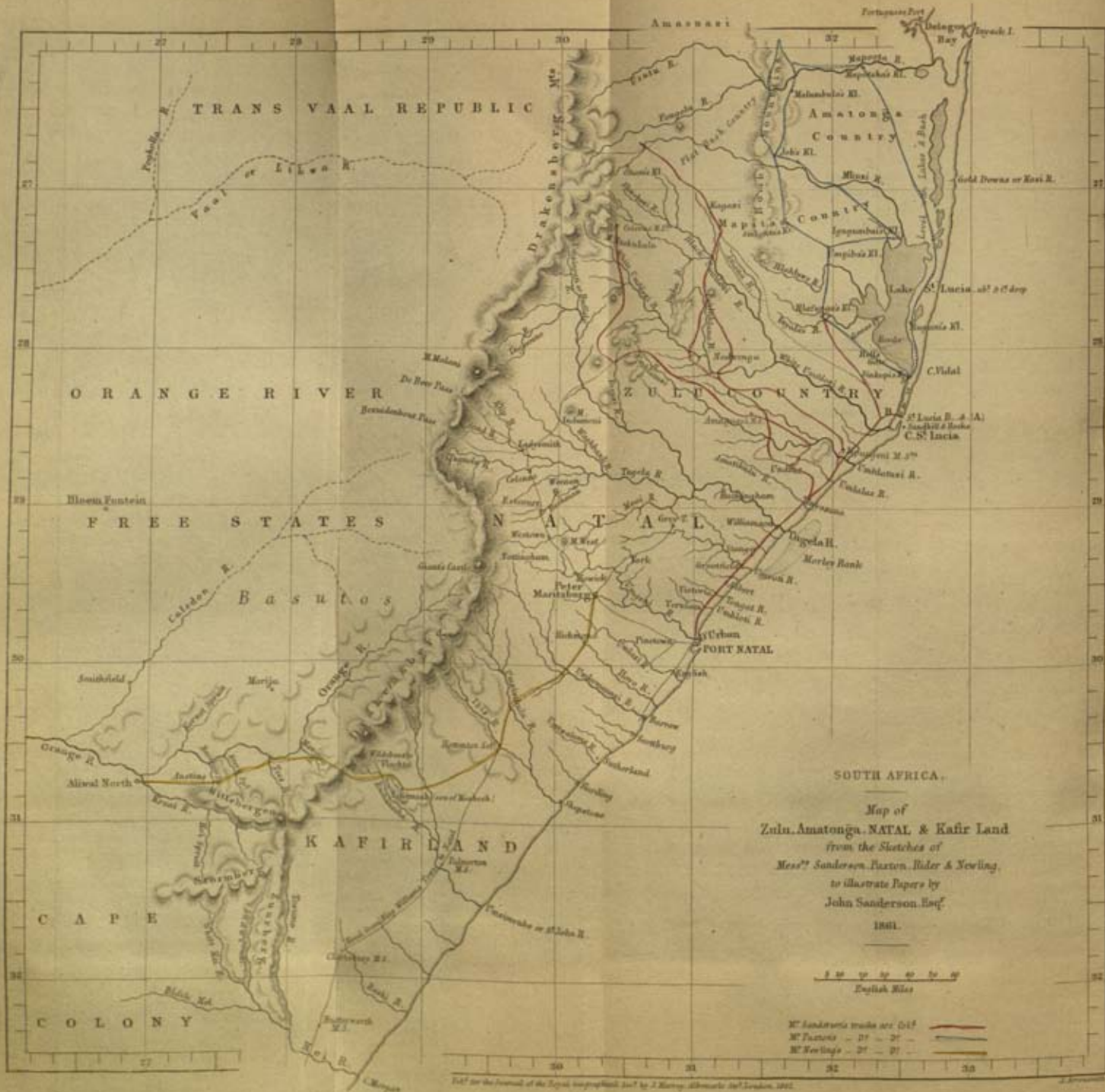
In all rather more than 400 species of plants were collected between Tāk and Bunnō, about 70 of these being wood-climbers, shrubs, or sub-arboreous, the rest herbaceous; but as many of the species have yet to be identified, I can give no more minute analysis than the above.

The proportion of grasses, in all 50 species, is large, being about one-eighth of the plants collected; but if we exclude them, the number of endogens, including the single orchid, is strikingly small, and depends in part, like the absence of forest-trees and the scarcity of ferns, on the deficiency of moisture.

For the manifold imperfections of these notes on Wuzceeristān, apology as regards the botanical part will be hardly necessary to those who have botanised in unexplored districts, beyond the possibility of reference to libraries and herbaria; and I have thought it better to insert even my few notes on the geology of the country than to leave the subject quite untouched.

As regards identifications of plants, I have in general only trusted myself where my data were pretty sure; and I venture to think that my errors in this respect will be found to be more of omission than of commission.





XXIII.—*Notes to accompany Sketch-Maps of the Zulu and Amatonga Countries, and of the Country between Alinal, North, and Natal.** By JOHN SANDERSON, Esq.

THE Map of the Zulu and Amatonga countries is compiled chiefly from sketches and oral information obtained from my brother, Mr. Septimus Sanderson, and the late Mr. Henry F. Paxton, both of whom have spent much time in the country and traversed it in various directions. The coastline I have laid down from the positions of the principal points as given in the East India Directory, edition 1855, which professes to give Captain Owen's observations corrected. In reference to these I ought to remark that Owen's St. Lucia does not agree with that of other observers, and is, perhaps, too far to the southward. The River Kosi, or Gold Downs River, which he places in lat. $26^{\circ} 53'$ s., and long. $32^{\circ} 53'$ e., and which is made to flow into the sea about the same position in numerous maps I have met with, is undoubtedly the Mkuzi, which on four or five independent and trustworthy authorities I have no hesitation in stating flows, or at least a few years ago flowed, into the lake at the head of St. Lucia Bay. Mr. Paxton, too, in a note upon a sketch in my possession, marks that part of the country as traversed by "no running streams." At the same time I think all the accounts may be reconciled by a report mentioned by my brother, "that since the floods of April, 1856, the Mkuzi had burst out to the sea in a direct line." If this report is correct, the river has, in all probability, only resumed a former channel. Such an occurrence is by no means singular or even rare on this line of coast. The same floods caused the river Umgeni to discharge itself for a time into the Bay of Natal, 3 or 4 miles south of its former outlet, inundating in its course part of the town of D'Urban. I am farther informed that the mouth of St. Lucia Bay itself, which I have laid down from a sketch by Mr. William Rider, was much altered by the mass of water brought down by the Mkuzi in the month referred to. The prin-

* *Zulu and Amatonga Countries*.—I should premise that the orthography I have adopted for native names is regulated on the principle of every letter being pronounced, and that with one uniform sound. To this the only exceptions (necessitated by the deficiencies of our English alphabet) are these: *ch* is to be regarded as one letter, having the same sound as in the Scotch or German *loch*; *sh* as one letter, and pronounced as in *shall*; *th* will therefore represent the sound of *ch* in *chain*; *h* before *l* will be strongly pronounced, nearly like *ll* in Welsh; when *ngg* is met with, the *n* and first *g* are to be considered as one letter, and the whole pronounced as *ng* in *linger*, *finger*, *longer*, not as in *singer*, *ringer*. *a* is to be pronounced as in *far*; *e* as in *air*, *bear*; *i* as in *machine*; *o* as in *home*; *u* as in *pull*; *se* as in *war*; *y* as in *year*.

All Kafir names are to be accented on the penultimate syllable: the apparent exceptions to this rule, *Mulas'*, *Ibis'*, *Mulalas'*, &c., are properly *Mulasi*, *Mulazi*, *Ibizi*, &c.

cipal outlet, I am told, is now where the "sand-hill, 100 feet high," is laid down, that sand-hill being almost entirely swept away, and a bank left between the old and the new mouths. In fact, all along the coast lakes and pools are formed, which in freshets are frequently connected with each other, and the various rivers adjacent; and circumstances, impossible to determine beforehand, may cause an old channel to be closed up, and a new one opened for the several streams. The general course of most of the rivers from the Zulu country to the Cape colony is from north-west to south-east, while in nearly every instance the opening into the sea is at right angles to this course, and directed towards the north-east. A sandbar is almost invariably formed outside, and these banks in dry seasons becoming attached to the mainland and gradually acquiring height, frequently enclose lagoons of several miles in length. Heavy rains bring down and deposit trunks of trees, reeds, and other débris, on the sandbanks at one spot, and at another undermine them, and thus divert the mouth from point to point often miles apart.

Mr. Rider went to St. Lucia in July, 1853, in charge of a little cutter, the *Liverpool*, but, from being unacquainted with the proper channel, got aground at the point marked 1 at the entrance to the bay. He remained in the neighbourhood for nearly five months, shooting sea-cows (the colonial name for the hippopotamus), which then were, and I believe still are, numerous; and encamping successively at the points marked 1, 2, 3, and 4, besides cruising about the upper bay or lake, and sailing up the Mkuzi to a distance of 30 miles. Mr. Edmondstone, with a party, proceeded to double that distance in a boat.

Although both sheets of water are termed "the Bay" by traders, it will be more correct to confine that designation to the lower, and style the upper, which is fresh water, and unaffected by tides, "the Lake." The entrance to the bay was, at the time of Mr. Rider's visit, about 50 feet across at low water, with 12 feet water at spring-tide; the rise and fall being 4 feet 6 inches, and time of high water at full and change at 4 o'clock. The point marked B is a rocky angle in the channel, abounding in oysters, distant about 2 miles, and bearing about north three-quarters east by compass from the entrance at A. Camp No. 3 bears about north-east three-quarters east from B, distant about 20 miles. Camp No. 4 is $1\frac{1}{2}$ to 2 miles from B. From No. 3 to the mouth of the Mkuzi bears about north-east by north, and is a distance of about 50 miles. The tide does not flow above the three channels near No. 3. Of these the western one is about 20 feet wide, with a depth of 12 feet, and flows between steep banks. The mid-channel is not so deep, but is 200 yards in width, while the eastern one, 150 yards or so in width, is still shallower, in some places not

exceeding 4 or 5 feet in depth. The lake is about 25 miles in width at the broadest part, but its average depth does not exceed 9 feet, with a muddy bottom. Goose Point is much frequented by wild geese in large flocks. Hell's Gate is merely a name given to a point in the lake where the reeds from the eastern side so nearly approach the western shore as only to leave a narrow channel.

The mouth of the river Umflosi is distant about 5 miles from the entrance to the bay at A, while at a similar distance to the southward along the sea-shore is a little bight enclosed by a reef of rocks, and affording shelter and anchorage for small boats in 3-fathom water. Nearly abreast of this, at 2 miles from the shore, the letter C will be found marked in the sketch, from which a point, probably Captain Owen's Cape Vidal, bears north-east by east, distant about 25 miles. These particulars are furnished me by Mr. Rider from memory. When on the spot, however, he made careful drawings and observations, copies of which he furnished to the Post-Office at Port Natal, and which have in all probability been transmitted to the Admiralty, together with the soundings on Morley Bank, which Mr. Rider also tells me he was the first accurately to examine and sound. He found much less water on the bank than had been previously supposed, and this probably led to the *Hermes* being despatched to survey it on her visit to Natal soon after.

Panda, the chief of the Zulus, is at constant feud with the Amatonga, over whom, indeed, he claims sovereignty. Since the massacre at the Tugela in 1855, when Umbulazi and several other of Panda's sons were killed, the contest for the succession has lain between Ketshwayo (Umbulazi's rival) and Oham, sons of Panda by different mothers, but of about the same age. Each, besides being almost supreme in his own district, has adherents scattered throughout the country; but Panda is said to have nominated Ketshwayo as his successor, and, on the whole, the chances are believed to be in his favour. A struggle, however, is constantly threatening, and will probably take place on the decease of Panda, if not before.

Country between Aliwal (North) and Natal.—It had long been a tradition in Natal that the Uyses, and others of the early Dutch settlers, had entered the district, descending the Drakensberg at a point much to the southward of the usual passes—De Beer's and Bezuidenhout's. A few years ago a false report of the discovery of gold at Smithfield caused a good deal of excitement in Natal, and a subscription was entered into with a view to reward any one who should discover or make known an available waggon-road to the free state by the route named. An exploring party was also sent out by the Natal Government; but, although they had abun-

dant sport with the numerous herds of game, they were unsuccessful in the ostensible purpose of the expedition. Meanwhile the excitement died away, and little farther was heard about the short route to the Cape Colony and the free state, until Mr. William Newling, a former resident in Natal, but who had latterly been living in Aliwal, on the Orange River, determined, if practicable, to return by this route, and induced Mr. James Wilson and Mr. Herbert Merrick to accompany him. Having met with the whole party in Maritzburg a day or two after their arrival, I wrote the following notes from Mr. Newling's dictation, and made a sketch under his eye, a copy of which I beg herewith to hand the Society. I do not accurately know the position of Aliwal, but Smithfield I have laid down in lat. $30^{\circ} 10'$ s., and long. $26^{\circ} 50'$ e., from an observation communicated to me by Mr. Robert Moffatt, jun., Government-Surveyor. Mr. Newling having informed me that he had not seen the Witteberg, the Stormberg, and the Zuurberg, with the rivers rising in them, correctly laid down in any map which had fallen in his way, I have included them in the same sketch.

“MEMORANDUM of information received from Mr. William Newling of a Journey on horseback from Aliwal, on the Orange River, to Pieter-maritzburg, Natal.

“Starting from Aliwal and travelling eastward on the south bank of the Orange River, at a distance of about 36 miles (six hours), you reach Austin's, the Superintendent of the Native Reserve, situated at the western extremity of the Wittebergen. Keeping to the north of this range, which runs to the eastward and joins the Drakensberg, you cross successively the bamboo and sterk sprints, with a low spur of the Wittebergen between them, the distance being 12 to 15 miles from Austin's to the latter stream. Still keeping eastward, with the Orange River on the left and the Wittebergen on the right, to a distance of 15 or 18 miles, you cross the Telli, or Tees River, immediately above its junction with the Orange River. The course of the latter is now somewhat more from the north-east, until at a distance of about 15 miles from the Telli it bends nearly due north, receiving at about this point the Maziuyo from the east or south-east. Here you leave the Orange River, crossing twice a bend of the Maziuyo, which rises in the Drakensberg, about 5 or 6 miles above the second crossing. This range of mountains runs, from the point at which you cross it, on the right nearly due south, on the left to the north-east. As you descend from the mountain by easy slopes, you enter upon undulating plains with flat-topped isolated hills, a

small stream running parallel with your course on the left, and rising in the mountains at a point close by the source of the Maziuyo. As it runs eastward it receives several tributary streams from the north-west, and forms the Enchanecha, which you cross about 24 miles from the top of the range. On the farther bank, where you cross, a mountain begins, and runs south-east. You round its north-western extremity, and, skirting its north-eastern face, reach Nehemiah's place [a son of Moshesh]. On the left is a great plain with isolated hills, abounding in game, and known as Wildebeeste Vlachte, or Gnu-Flat. Once more taking a course nearly due east, you cross the Umzimvubo, or St. John's River, which is joined about 30 miles below Nehemiah's by the Enchanecha, both having a generally south-easterly course from their rise in the Drakensberg. Your course now bends from the comparatively high ground through which the Umzimvubo flows, for about 10 miles, over a plain, and then down a gentle slope, a spur of the Drakensberg, to the eastward, with a slightly northern inclination, until you reach a settlement of Hottentots on the Ibis River. One of them, Piet, formerly in the employment of Mr. G. C. Cato at Port Natal, was very hospitable. From this point, where you join the main road between King William's Town and Natal, you cross the Ibis, and your course is nearly due north to the Umzimkulu, a distance of about 15 miles.

"By this route Aliwal is distant from Port Natal about twenty-one days' trek (journey) with a waggon. It is passable for a light waggon now, and could at a moderate expense be opened up for heavy traffic. The distance is about the same as to Algoa Bay, twenty-one days' trek, but it has the advantage of having better grass and being better watered, as well as less liable to interruption from the rivers, which on this route fall much more rapidly.

"Mr. Newling and his companions started on the 4th January, 1860, arriving at Maritzburg on the evening of the 19th, after two or three stoppages from heavy rains."

To the above notes I have to add that the Rev. Horatio Pearse soon after the above dates started from Pieter-Maritzburg in a light horse-waggon, and ascended the Drakensberg by this route, returning by Harrismith and the northern passes. An account of his journey appeared shortly after in the *'Natal Courier.'* *

* See Mr. Sanderson's Paper on the Orange River Free State, &c., in the 30th volume of the *Journal of the Royal Geographical Society*.—Ed.

XXIV.—*Diary of Mr. JOHN M'DOUALL STUART'S Explorations to the North of Murchison Range, in 20° s. Lat., 1860-61.**

Read, November 25, 1861.

Wednesday, April 17, 1861.—Quartz Hill, West Mount Blyth. Started at 7.25 A.M., on a bearing of 70°. We again passed quartz hills running as yesterday; the spinifex still continuing, with a little grass, until we came within a mile of the hills in the Murchison Range; † finding some water, I camped, and gave the horses the rest of the day to recruit. Some of them are looking very bad, and, if I push them too much, I shall have to leave a few behind. Last night, after sundown and during the night, we had a few slight showers of rain and a great deal of thunder and lightning, mostly from the south-west. About eleven to-day the clouds all cleared away. About a mile before camping, we observed the ground covered with numerous native tracks; also that a number of the gum-trees were stripped of their bark all round.

Thursday, April 18.—West Mount Blyth. Started at 7.40 A.M., same bearing, across the Murchison Ranges, in which we found great difficulty. On the north-east side of Mount Blyth we found a large gum-creek of permanent water and camped. I have named this Ann Creek. I then rode to the highest point of the range, taking Thring with me, to see if there is any rising ground to the north-west by which I may cross the gum-plain. I could see no rise—nothing but a line of dark green wood on the horizon. We had great difficulty in getting to the top, the rocks being so precipitous. In coming down the eastern side we were gratified by the sight of a beautiful waterfall, upwards of one hundred feet high, composed of columns of basaltic rock—its form two sides of a triangle, the water coming over the angle. Wind s.e.

Friday, April 19.—Ann Creek. Started at 7.45 A.M., on a course 324°, towards Mount Samuel. The country the same as I have described on my previous journey. After sundown arrived at Goodiar Creek; one of the horses done up, had to leave him a little distance back—he is unwell. On leaving the Murchison Range we crossed a number of quartz reefs and hills running east and south-west. Wind s.s.e.

Saturday, April 20.—Goodiar Creek. Three horses missing this morning, in consequence of the scarcity of feed; the horse

* Mr. Stuart has since succeeded in crossing the continent from Adelaide to Van Diemen Gulf. He left Adelaide October 26, 1861, followed his previous routes to the parallel of 17° s., and then, keeping on the same course, reached a point on Van Diemen Gulf, July 25, 1862, having performed his journey to the north coast in nine months. He returned to Adelaide after an absence of twelve months and thirteen days.—Ed.

† See vol. xxxi. of 'Journal' of Royal Geographical Society for maps, &c.—Ed.

left behind last night is brought in; he looks very bad indeed. About 11 A.M. the other horses were found, brought in, and saddled, and we proceeded on a N.N.W. course for Bishop Creek, but found the unwell horse too ill to proceed farther than Tennant Creek, where we camped, there being plenty of water and feed. Two natives were seen by Masters this morning, when in search of the horses; he could not get them to come near him. Wind S.W.

Sunday, April 21.—Tennant Creek. Wind from south-west, a few clouds from east.

Monday, April 22.—Tennant Creek. The horse that is unwell still looking very ill, I must do a short journey with him to-day. Started at 7:30 A.M., course 21° , for Bishop Creek, and at 12 miles made it. I find that two of the horses are so weak that they are unable to go any farther without giving in; I have therefore camped, giving them the remainder of the day to recruit. Native smokes are all around us, but at some distance off. Wind E.

Tuesday, April 23.—Bishop Creek. It is late before we can get a start to-day, in consequence of one of the horses concealing himself in the creek. He is an unkind brute; we have much trouble with him in that respect—he is constantly hiding himself somewhere or other. Started at 9:30 A.M., on a course of 17° , to cross Short Range. Found plenty of water in Phillip Creek; the grass on the banks and the plains where it empties itself is splendid, $2\frac{1}{2}$ feet long, fit for the scythe to go into, and an abundant crop of hay could be obtained. We then crossed the range a little north of where I passed before, and found some slight difficulty. After descending we struck a small creek which supplies Kekwick Ponds, and is a tributary to Hayward Creek; found plenty of water, and camped at $\frac{3}{4}$ P.M. Feed abundant. Wind S.E.

Wednesday, April 24.—Hayward Creek. Started at 7:40 A.M.; course, 17° . At 9:30 changed to $14^{\circ} 30'$ west of north, and at 12:30 arrived at Attack Creek; camped at the same place that I did on my former journey. Tracks of natives about, but we have seen none of them. I kept about a mile to the west of my former track, and found the country much more open; 6 miles is poor, country being scrub and spinifex mixed with grass. The banks of both creeks for two or three miles are splendidly covered with grass, in some places over the horses' heads. Four of the horses are ill, and looking very bad indeed. Wind S.W.

Thursday, April 25.—Attack Creek. Started at 7:50 A.M., on a course of 294° , to top of the range, which I have named Whittington Range, after William S. Whittington, Esq., of Adelaide. At 6 miles reached the top. At 9:50 changed to north-west, and at 11:30 struck a large gum-creek running east, with large water-

holes in it. At about 200 yards crossed it again, running to the west, and shortly afterwards crossed it again, running to the east. This being our first new discovery, I have honoured it by calling it Morphett Creek, after the Hon. John Morphett, Chief Secretary. We then ascended another portion of the range, and continued along a spur on our course. This range presents quite a new feature, in having gums growing on the top and all round it; it is composed of masses of ironstone, granite, sand, and limestone, and in some places white marble. The view to the east and south-east is apparently thick wood or scrub; to the north-east another range. Not being on the highest part I could not see the other points; the course of it is about N.N.W. Thinking that the creek we had passed might break through a low part of the range, which I could see to the north-west, at 10 miles I changed to west, and crossed to the other range, but found the dip of the country to the south. We could find no water; traced the creek to the south-east for 2 miles, found some water, and camped. The range is very rough and stony, covered with spinifex; but the creeks are beautifully grassed. Native smoke to east. This is one of the sources of Morphett Creek, and flows to the east; it is as large, if not larger, than Attack Creek, and, in all probability, contains waterholes quite as fine to the eastward. Lat. $18^{\circ} 50' 40''$.

Friday, April 26.—Morphett Creek. At 8 A.M. started on a course of 300° to cross the north-west part of the range. At 9-30 changed to $316^{\circ} 40'$ to a clear hill. At 10-30 passed through a grassy plain, with gum-trees. At 11-45 on the top of the last spur. At 3 P.M. changed to 340° to some large gum-trees, to see if there is a creek. At two miles came upon a small creek, coming from a large grassy plain, which lies to the east of our track. Followed it down in search of water for three miles, but could find none. Run it out into a grassy plain, with gum-trees. I then returned to where I left the party, followed it up into the large grassy plain for about one mile, but, finding no appearance of water, camped after sundown. This plain is of the same description as John's Plain, that I met with on my former journey to the north-east of Bishop Creek—a large open plain covered with grass, and with only a few bushes on it. The journey to-day has been very rough and stony—mostly over rises of the range, which we have not yet got clear of. It is covered with spinifex, gum-trees, and scrub. The creeks run a short distance from the hills, and form small grassy plains. Not a drop of water have we passed to-day, nor is there the appearance of any on before us. I shall be compelled to fall back to-morrow to the water of last night. Four of the horses, I am afraid, will not be able to get there. I must try more to the north, and endeavour to get quit of the plains, and get amongst the creeks. There is no hope of suc-

cess on this course. The country has now the appearance of summer. All the grass being quite dry, the rain we have had below does not seem to have reached thus far. It must be the midsummer rains that supply this part of the country. Lat. $18^{\circ} 38'$. Wind E.

Saturday, April 27.—Grassy Plains. Started at 7.10 A.M., course 110° , to the other side of the plain. At 3 miles came upon a small creek running towards the north; I followed it down to the north. At 3 miles came upon a fine large creek, coming from the south-east, with plenty of water; returned to the party, took them down to the large creek on north course, and at 3 miles camped. Two of the horses are nearly done up. Wind S.E. Lat. $18^{\circ} 35' 20''$.

Sunday, April 28.—Tomkinson Creek. Sent Thring down to examine and see how the creek runs—which I have named after S. Tomkinson, Esq., Manager of the Bank of Australasia, at Adelaide. We have found many new plants and flowers, also some trees, one of which grows to a large size—the largest about a foot in diameter. The fruit is about the size and colour, and has the appearance, of plums; the bark is of a grey colour, the foliage oval and dark-green. Another is more of a bush, and has a very peculiar appearance; the seed-vessel is about the size of an orange, but more pointed. When ripe it opens into four divisions, which look exactly like honeycomb inside, and in which the seeds are contained; they are about the size of a nut (the outside is very hard). The natives roast and eat them. The leaves resemble the mulberry, and are of a downy light-green. We have obtained a few of the seeds of it. The bean-tree does not seem to grow up here. Mr. Kekwick, in looking for plants this morning, discovered one which very much resembles wheat in straw (which is very tough), ear, and seed. It grows 2 feet high. The seed is small, but very much like wheat, both in shape and colour. At about 3 P.M. Thring returned, having run the creek out into a large grassy plain. Its course is W.N.W. for about 9 miles; it then turns to west, and empties itself into the plain. There is plenty of water about, but where it empties itself it becomes quite dry. The native companion, the emu, and the sacred ibis are on this creek. The country is splendidly grassed. We have got to the north side of the Whittington Range. I will have to leave my two done-up horses here, and will get them when I return. The hills and rocks are of the same description as the first part of the range. Wind S.; sun hot; but the nights and mornings are very cold.

Monday, April 29.—Tomkinson Creek. Had a late start this morning, in consequence of my having to take a lunar observation. Started at 10.30 A.M. At 2 miles changed to 330° , to a high hill.

At 2 miles met with a gum-creek, containing water. At 2-10 P.M. reached the top of the high hill; from this we could see a gum-creek. Started at 2-30 to examine it; found water, and camped at 4. Bearing from water to high hill, 110° , which I have named Mount Primrose, after John Primrose, Esq., of North Adelaide. This water will last us six or eight weeks. The country passed to-day has been mostly stony rises of the same description as the other parts of the range. The valleys have a light sandy soil, nearly all with spinifex and scrub. There is very little grass in the creek at this place; its course at Mount Primrose is W.N.W.; on the other side of our camp it turns to south-west. The view from the top of Mount Primrose is not extensive, except to the west and south-west, which appears to be thick wood or scrub. There are native smokes in that direction. To the north and north-east I could see two other grassy plains; beyond them is another stony ridge, which prevented my seeing farther than about 6 miles. To the north-west are high rough hills, which continue round to south-west, and seem to be lost in the woody plain. Near the top of Mount Primrose we met with a scrub, *Eucalyptus demosa*, about half a mile through. There is also the appearance of a high range in the far distance, towards the south-west. I trust this bad country will not continue much longer. Wind S.E. Lat. $18^{\circ} 25'$.

Tuesday, April 30.—Carruthers Creek. The creek in which we are now camped I have named Carruthers Creek, after John Carruthers, Esq., of North Adelaide. Started at 8-50 A.M., course 335° , to another high hill. At 9-50 reached the top; changed our course to another high hill. At 10-30 crossed a gum-creek running to south-west, with water in it. At 11-25 reached the top of the range; descended, and at 1-50 P.M. found a creek running from the range, with a splendid hole of permanent water situated under a cliff, where the creek leaves the ranges. It is very deep, with a rocky bottom. From the top of the range the country seems to be very thick, which I am afraid is scrub; no high hills visible. To the north of this the range appears to cease; I wish it had continued for another 60 miles. The country passed to-day has been stony rises coming from the range, very rough and rocky indeed. My horses' shoes are nearly all gone. I am obliged to let some go without; they have felt the last four rough days very much. Spinifex, scrub, and stunted gums all the day, with occasionally a few tufts of grass; this is very poor country indeed. Native smokes still in south-east. The hills of the same formation as those we first came upon in entering the ranges from Attack Creek. This creek I have named Hunter Creek, after Mr. Hunter, of Messrs. Hunter, Stevenson, and Co., of Adelaide. Camped. The horses seem very tired. Wind E. Lat. $18^{\circ} 17'$.

Wednesday, May 1.—Hunter Creek. Started at 8 A.M.;

course 305°. At 8:45 crossed the Hunter, going south-west. It came round again, and continued crossing our course thirteen times in 9 miles, after which it was lost in a large grassy and gum-plain. At 3:15 P.M. changed to north; at 4:15 changed to east, over a scrubby plain: at 5:15 camped. The plain in which the creek loses itself bears south-west; the banks are beautifully grassed, but about a mile on either side the soil is sandy, with spinifex and scrub, which continued for 9 miles; we then entered upon a scrub and grassy plain. Not finding a creek, or the least indication of a watercourse, and the scrub becoming very thick, with a new description of tree (which in places we saw about 1 foot in diameter; the bark is grey and rough, having a small, dark green leaf, shaped like a butterfly's wing: it is a very handsome tree, with drooping branches), I changed to north, to see if I could find water; but at 3 miles we lost the gums, the new tree taking their place, and becoming very thick scrub, with plenty of grass, but no sign of a watercourse. I again changed to east, in the hope of cutting one in that direction. At 1½ miles again came upon small gums; and at 3 miles seeing neither creek nor any hope of getting water, camped. The horses very tired. Wind light from W.N.W. Lat. 18° 3' 19".

Thursday, May 2.—Large scrubby and grassy plain. Started at 10 A.M., in consequence of some of the horses having strayed a long way to the east during the night; course 143° 30', back to Hunter Creek. I have taken a different course, to see if there is any creek that supplies this plain with water. For about 9 miles we passed over a splendidly grassed plain, with gum-trees, the new tree, and a number of all sorts of bushes. One part for about 3 miles is subject to inundation, the *Eucalyptus demosa* growing thick on it. We then passed over about 2 miles of spinifex and grass, and again entered the grassy plain, which continued to Hunter Creek. During the whole day we have not seen the shadow of a creek or watercourse; it is a great disappointment to be forced to return back from such good country through want of water. If there had been any sign of a watercourse, or if I could have seen any rising ground near our course, I would have gone on another day. I sent Wall to the top of the highest tree, to see if there is anything within view; he can see nothing but the same description of plain. If my horses can travel to-morrow (the last three days have been so very hot that it has nearly done up some of them), I will try a course to the north, and run down the creek, to see if there is one that will lead me through this plain. If I could get to some rising ground, I think I should be all right; but there is none visible, except the end of the range, which is lost sight of to the north-east. Wind again S.E., with a few clouds. Lat. 18 13' 40".

Friday, May 3.—Hunter Creek. Started at 8:40 A.M., course 360°. At 11:15 (9 miles) came upon a creek, dry sandy bed. Searched for water, and at three-quarters of a mile to east found a nice hole; watered the horses, and proceeded on the same course, starting at 12. At 3:20 P.M. changed to 20° N. of E. The first 10 miles was over a plain of gums, covered with grass 2 feet long; the creek which we crossed and watered at empties here. We had then 6 miles of spinifex and a thick scrub of dwarf lance-wood, as tough as whalebone; after that we entered upon another gum-plain, also splendidly grassed, which continued for 4 miles, when the gums suddenly ceased, and it became a large open plain to the north as far as I could see. To the north-west is a small hill, with woody country around it; to the north-east is a low range. Seeing no appearance of water, I changed my course to 30° N. of E., to some high gums; and at 1 mile, finding none, I camped without it. This seems now to be a change of country. There is no telling when or where I may get the next water on this course, so that I shall be compelled to go towards the range to-morrow to get some, and have a long day's journey to the new country. The wind has been from E. all day. Lat. 17° 56' 40".

Saturday, May 4.—Sturt Plains. Started at 7:15 A.M., course east, to find water. At 3:20 P.M. came upon a little creek, and found a small quantity of water, which we gave to the horses. Started again at 9 P.M., course south-east, following the creek to find more. At 1½ mile found water, which will do us until Monday morning. I proceeded to the top of the range, to obtain a view of the country round, but was disappointed in its height; from the plain it appeared higher than it really is. This range I have named Ashburton Range, after Lord Ashburton, President of the Royal Geographical Society. The point upon which I am at present is about 3 miles east of our camp. The view from south to north-west is over a wooded plain; from north-west to north is a large open plain, with scarcely a tree upon it. No range or high country visible in the far distance, except this range and a low rise to north-west. On leaving our last night's camp we passed over 3 miles of the plain, which is subject to inundation. There are numerous nasty holes in it, into which the horses were constantly stumbling; it is covered with splendid grass, and is as fine a country as I have ever crossed. These plains I have named Sturt Plains, after the venerable father of Australian exploration, and my respected commander of the expedition in 1845. Ashburton Range is composed of sandstone and ironstone, granite and a little quartz; it is very rough and broken. Native tracks about here. Wind S.E. This creek I have named Watson Creek, after Mr. Watson, formerly of Clare.

Sunday, May 5.—Watson Creek, Ashburton Range. Sent

Thring to the north, along the range, to see if there is permanent water; at 8 miles he returned, having found plenty. One large hole is about a mile from here; in another creek it is apparently permanent, having a rocky bed. A flight of pelicans overhead to-day; they seem to have come from the north-west, which course I will try to-morrow. Wind S.E. Lat. $17^{\circ} 58' 40''$.

Monday, May 6.—Watson Creek, Ashburton Range. Started at 8:20 A.M., course 300° , to cross Sturt Plain. At 11 miles arrived at the hill which I saw from Ashburton Range. It turned out to be the banks of what was once a fresh-water lake; the water-wash is quite distinct. It had small iron and limestone gravel, with sand and a great number of shells, worn by the sun and atmosphere to the thinness of paper, plainly indicating that it is many years since the water had left them. Judging from the water-marks, the lake must have been about 12 feet deep in the plain. The eucalyptus is growing here. We then proceeded over another open part of it for about 2 miles, when the dwarf eucalypti again commenced, which continued until we camped at 21 miles; the horses quite worn out. This has been the hardest and most fatiguing day's work we have had since starting from Chambers Creek; for, from the time we left in the morning until we camped, we have had nothing but a succession of rotten ground, with large deep holes and cracks in it, caused at a former period by water, into which the poor horses have been constantly falling the whole day, running the risk of breaking their legs and our necks, the grass being so long and thick that they could not possibly see them before they were into them. I had a very severe fall into one of these holes; my horse came right over, and rolled nearly on top of me. I was fortunate enough to escape with little injury. Some of the shells resemble the cockle-shell, but are much longer, many of them being 3 or 4 inches long; the others are of the shape of periwinkles, but six times as large; both sorts are scattered over the plain, which is completely matted with grass. The soil is a dark rich alluvial; and judging from the cracks and holes—some of which are of considerable depth—they are splendid plains, but not a drop of surface-water could we see upon them, nor a single bird to indicate that there is any. It was my intention at starting to have gone on 30 miles, but I find it quite impossible for the horses to do more. It would be madness to take them another day over such a country, when from the highest tree we can see no change. If I were to go another day and be without water, I would never be able to get one of the horses back, and in all probability would lose the lives of the whole party. If I could see the least chance of finding water or a termination of the plain, I would proceed and risk everything. I see there is no hope of my reaching the river by this course. I believe this gum-plain to be a continuation of the one I met with beyond

the Centre, and that it may continue to the banks of the Victoria. The features of the country are nearly the same; the absence of all birds has a bad appearance. Day very hot. Wind S.E. Lat. $17^{\circ} 49'$.

Tuesday, May 7.—Sturt Plains. Before sunrise this morning I sent Wall up a tree, to see if any hills or rising grounds would be visible by refraction. To the west, with a powerful telescope, he can just see the top of rising ground. As the grass is now quite dry, the horses feel the want of water very much; many of them are looking wretched, and I hardly think will be able to reach it. However reluctant, I must go back for the safety of the party. At 3 P.M. arrived at the creek which Thring found about 1 mile to the north of my former camp, with the loss of only one horse. We had to leave him a short distance behind; he would not move a step farther, although during a great part of the journey he had been carrying little or nothing. This water will last two months at least; feed good. It is inside the first ironstone rise in Ashburton Range, in a gum-creek which empties itself into the plains. This creek I have named Hawker Creek, after James Hawker, Esq., of Her Majesty's Customs, at Port Adelaide. The day has been very hot. Wind S.E. Lat. $17^{\circ} 58'$.

Wednesday, May 8.—Hawker Creek, Ashburton Range. I have sent Masters back to bring up the horse we left behind. Sturt Plains have been at one time the bed of a large fresh-water lake: our journey of the 6th instant was over the middle of it, and we were not at the end of it when I was forced to return; the same rotten ground and shells continued, although we had got amongst the eucalypti. I shall give the horses a rest to-day, and to-morrow will take the best of them (those that I had out on my former journey), and endeavour to cross the plain to the rising ground seen yesterday morning; I shall take Thring and Woodforde, with seven horses and one week's provisions. I may be fortunate enough to find some water, but from the appearance of the country I have little hope; I shall, however, leave nothing untried to accomplish the object of the Expedition. In the morning the horse we left behind could not be found: sent Masters and Sullivan in search of him; in the afternoon they returned with him, looking miserable. He had wandered away beyond the other camp.

Thursday, May 9.—Hawker Creek, Ashburton Range. Started at 7 A.M. with Thring and Woodforde and seven horses, following our tracks through the rotten ground to the first eucalypti for about 12 miles, as it made it lighter for the horses, the tracks being beaten to that place. Changed our course to 282° , still journeying over Sturt Plains: at 27 miles arrived at the end of the portion of them that had been subject to inundation; but there are still too many holes to be pleasant. I certainly never did see a more

splendid country for grass; in many places for miles it is above the horses' knees. We entered upon red sandy soil, with spinifex and grass, from which we changed our bearing. The country became thickly studded with eucalypti, in one or two places rather open, but generally thick. After the 27 miles we again met with the new small-leaved tree, the broad-leaved mallee, the eucalypti, and many other scrubs. At sundown we camped; distance 33 miles, but not a drop of water have we seen the whole day, or the least indication of its proximity. I hope to-morrow we will be more fortunate and may find some. Wind s.

Friday, May 10.—Sturt Plains. This morning there are a few birds about. Started at 8.15 A.M., same course; at 10.30 arrived on first top of rising ground seen from the camp of 7th instant, which turns out to be red sandhills covered with thick scrub. Changed our course to north-west, and at 11.15 arrived at the highest point: the view is very discouraging, nothing to be seen all round but sandhills of the same description, their course N.N.E. and s. to w.; no high hills or range to be seen through the telescope. We can see a long distance, seemingly all sandhills with scrub and stunted gums on them: the first ridge is about 200 feet above Sturt Plains, but farther to the west they are much lower, and become seemingly red, sandy, undulating table-land. There is no hope of reaching the Victoria on this course. I would have gone on farther to-day had I seen the least chance of obtaining water to-night; but during the greater part of yesterday and to-day we have met with no birds that frequent country where it is, plainly indicating that we are not in the proximity of it. Both yesterday and to-day have been excessively hot, and the country very heavy, which cause my horses to feel the want of water very much, although they are of the best of the lot \bar{c} , and most of them have been out on my previous journeys and are accustomed to privations; they even feel it more than I expected. Could I have obtained water last night or this morning before leaving the plains, I would have tried 60 miles of the sandy country; I do not think it will continue a greater distance than that before a change takes place. From this point I can see 25 miles without anything like a change; to go on now with such a prospect and such heavy country before me, would only be sacrificing our horses and our own lives without a hope of success—the horses having already come 45 miles without a drop of water, and over as heavy a country as was ever travelled on. I have therefore, with reluctance, made up my mind to return to the camp and try it again farther north, where I may have a chance of rounding the sandhills; the dip of them from here seems to be s.s.w. Turned back, and at 18 miles camped on Sturt Plains, where there is green grass for the horses. Wind s.

Saturday, May 11.—Sturt Plains. At dawn of day started

for the camp; arrived at 2 P.M. It was fortunate I did not go on farther, for some of the horses were scarcely able to reach it—a few more hours and I should have lost half of them; the day has been so hot that it has nearly knocked them all up: found the rest of the party all right at the camp. We had a job to keep the horses from injuring themselves by drinking too much water; I gave them a little three separate times, tied them up for twenty minutes, and then gave them a good drink and drove them off to feed: they took a few mouthfuls of grass, and were back again almost immediately, and continued to do so nearly all the afternoon; they drank an immense quantity. Wind s.

Sunday, May 12.—Hawker Creek, Ashburton Range. My old horses that were out with me before look very well this morning, but the others, whose first trip of privation this has been, are looking very bad indeed; they could not have gone another night without water—it has pulled them down terribly. Yesterday, while Masters was looking for the horses, he saw what appeared to him to be a piece of wood stuck upon a tree, about $2\frac{1}{2}$ feet long, sharp at both ends, broad at the bottom, and shaped like a canoe; having pulled it down, he found it to be hollow: on the top of it were placed a number of pieces of bark, and the whole bound firmly round with grass-cord; he undid it, and found the skull and bones of a child within. Mr. Kekwick brought it to me this morning for my inspection: it certainly is the finest piece of workmanship I have ever seen executed by natives. It is about 12 inches deep and 10 wide, tapering off at the ends; small lines are cut along both sides of it: it has been cut out of a solid piece of wood with some sharp instrument; it is exactly the model of a canoe. I told him to do it up again and replace it as it was found: 'if it is here when I return, I will endeavour to take it to Adelaide with me. Winds variable. A few clouds about.

Monday, May 13.—Hawker Creek, Ashburton Range. Started at 8 A.M., course 360° . At 5 miles crossed the large gum-tree creek, with water, that Thring found: proceeded along the side of Sturt Plains: at 10 miles ascended the north point of Ashburton Range; descended, and the country became red sand with spinifex, gum-tree, the new-leaved tree, and other shrubs very thick; at 15 miles gained the top of another stony rise; followed three creeks down in search of water; found a little, but not sufficient for us; followed it still farther down, leading us to the south for about 6 miles, but could find no more. I thought it best to return to the large creek for water, which I have named Ferguson Creek, after Peter Ferguson, Esq., of Gawler Town. From the top of the range the view is limited. To the north and north-east are stony rises, at about 9 miles distant: from north to west are Sturt Plains, in some places wooded; to the north they are open for a very long

distance: the country in the hills is bad, but in the plains is beautiful. I am afraid, from the view I have of the country to the north, that I will again meet with the same description of sandhills that I came upon on my last western course. Wind E.S.E., blowing strong. Lat. $17^{\circ} 53' 20''$.

Tuesday, May 14.—Ferguson Creek. Started at 8:30 A.M. on a north course to the place I turned back from yesterday; arrived at noon; changed course to 345° . Started again at 12:20. At 1 P.M. crossed a gum creek that has the appearance of water. At 1:40 changed course to 260° , and came upon two large water-holes, apparently very deep, situated in the rocks—they are seemingly permanent—and camped. I named this creek Lawson Creek, after Dr. Lawson, J.P., of Port Lincoln. A number of natives have been camped about them. We found another canoe, of the same description as the one in which the bones of the child were found: it is broken and burned, and seems to have been used as a vessel for holding water. Wind S.E., blowing strong. Mornings and evenings very cold. Lat. $17^{\circ} 43' 30''$.

Wednesday, May 15.—Lawson Creek. Started at 8:10 A.M., went a mile west to clear the stones; changed to 340° . At 2:45 P.M. changed again to 45° ; camped at 4:15. The first 12 miles is poor country, being on the top of stony rises, with eucalypti, grass, and scrubs. After descending from the rises we crossed a wooded plain, subject to inundation; no water. The trees are very thick indeed: they are the eucalyptus, the *Eucalyptus demosa*, the small-leaved tree; another small-leaved tree much resembling the hawthorn, spreading out into many branches from the root: it rises to upwards of 20 feet in height. We have also seen three other new shrubs, but there are no seeds on them. After crossing the plain we got upon red sandy rises, very thick with scrub and trees of the same description. We continued on this course until 2:45 P.M.; then, as there is an open plain in sight, with rising ground upon it to north-east, and as this scrubby ridge seems to continue, without the least appearance of water, I have changed to north-east. Crossed the plain, which is alluvial soil, covered with grass, but very dry. At 4:15 camped on the north-east side, without water. I would have gone on to the rise, but I feel so ill that I am unable to sit any longer in the saddle. I have been suffering for the last three days from a severe pain in the chest. Wind E. Lat. $17^{\circ} 16' 20''$.

Thursday, May 16.—Sturt Plains. Sent Thring to see if there is a creek or a sign of water under the rise. At 8:20 A.M. he returned, having found no water: it is a low sandy rise, covered with a dense scrub. Started at 8:20 A.M.; course east. At 3 miles I was forced to return, the scrub is so dense that it is impossible to get through; came back 2 miles; changed to 20° west of south to

get out of it; at 2 miles gained the plain; then changed to the east of south at 10.45. At 2 P.M. there is no hope of a creek or water. Changed to south-west; at 2½ miles struck our tracks and proceeded to Lawson Creek. We found the open parts of the plain black alluvial soil, so rotten and cracked that the horses were sinking over their knees, which continued for 6 miles: it is covered with long grass and polygnum, also a few eucalypti scattered over it; the scrub we were compelled to return from was the thickest I have ever had to contend with; the horses would not face it; they turned about in every direction, and we were in danger of losing them; in 2 or 3 yards they were quite out of sight. In the short distance we penetrated it has torn our hands, faces, clothes, and what is of more consequence, our saddle-bags all to pieces: it consists of scrub of every kind, which is as thick as a hedge; had we gone farther into it, we should have lost everything off the horses. No signs of water; from south to west, north and north-east, nothing visible but Sturt Plains, with a few sand-rises having scrub on them, which terminate the spurs of the stony rises; they are a complete barrier between me and the Victoria. I should think that water could be easily obtained at a moderate depth in many places on the plains. If I had plenty of provisions, I would try to make it by that way. The only course that I can now try is to the north-east or east, to round the dense scrub and plains. At sundown arrived at Lawson Creek. The horses, owing to the dryness of the grass, drank a great quantity of water; they are falling off very much. Wind S.E.

Friday, May 17.—Sturt Plains. I must remain here to-day to mend saddle-bags, &c. I have sent Thring to north-east to see if the stony rises continue in that direction; he has returned and gives a very poor account of the country: he crossed them in about 6 miles, and again came upon the plain that we were on yesterday, extending from north-east to south. Nothing but plains. To the north is the dense scrub, thus forming a complete stop to further progress: from here I fear it is a hopeless case either to reach Victoria or the Gulf. The plains and forest are as great a barrier as if there had been an inland sea or a wall built round: I shall rest the horses till Monday, and will then try a course to the north-west and another to north-east; I have not the least hope of succeeding without wells, and I have not sufficient provisions to enable me to remain and dig them. It is a great disappointment to be so near, and yet through want of water to be unable to attain the desired end. Wind S.E.

Saturday, May 18.—Lawson Creek. Resting horses, &c. Wind S.E.

Sunday, May 19.—Lawson Creek. Wind S.E.

Monday, May 20.—Lawson Creek. Started at 7.25 A.M.

Course 45° , with Thring, Woodforde, and seven horses. The first 4 miles was over the stony rises; the next 3 sandy table-land with spinifex, eucalyptus, and scrub. Crossed part of Sturt Plains, open and covered with grass. Five miles of it was very heavy travelling ground, very rotten, and full of holes and cracks. Camped on the plains at about 30 miles, where the scrub seemingly commences. The plains are of the same description as that already given, after leaving the stony rises. We have seen no birds nor any living thing except kites and numerous grasshoppers, which are in myriads on the plains. From this place to the E., and as far as S.S.W., there is no rising ground within range of vision—nothing but an immense open grassy plain: the absence of birds proclaims it to be destitute of water; we have not seen a drop, nor a creek, nor a watercourse during the whole day's journey. To-morrow I shall again try to get through the scrub. On leaving the camp this morning I instructed Mr. Kekwick to move the party about 3 miles down the creek to another waterhole, the feed not being good, and the country stony round the waterholes. Wind E.

Tuesday, May 21.—Sturt Plains, E. Started at 7-10 A.M. Passed through a very thick scrub 7 miles in extent; we again entered on another portion of the open plains at 10 miles from our last night's camp. Nothing to be seen on the horizon all round but plains. Changed to 300° , to where I saw some pigeons fly. At 2 miles came across their feeding ground; skirted the scrub until we cut our tracks; no appearance of water. This is again a continuation of the open portion of Sturt Plains; they appear to be of immense extent, with occasional strips of dense forest and scrub. We had 7 miles of it this morning as thick as ever I went through; it has scratched and torn us all to pieces. At my farthest on the open plain. I saw that it was hopeless to proceed, for from the W. to N., and round to S.S.W., there is nothing to be seen but immense open plains, covered with grass, subject to inundation, having an occasional low bush upon them. I think with the aid of the telescope I must have seen at least 60 miles; there is not the least appearance of the lowest rise, or any watercourse, neither can we see the tracks or smoke of natives in any direction. The sun on the plain is extremely hot. Having no hope of finding water this morning from the appearance of the plains, I left Woodforde with the pack and spare horses where we camped last night, as the heat and rough journey of yesterday have tired them a great deal—so much so that I fear some of them will not be able to get back to water. Returned to where I had left him, and followed our tracks back to the open plain. After sundown camped among some scrub. Horses very much done up; tethered four, and short-hobbled the two that had done the longest day's journey. Wind S.E.

Wednesday, May 22.—Sturt Plains. Our camping-place last night. After sunset we saw a number of turkeys flying towards the stony rises where our main camp is ; they appear to come from the north-west. Upwards of fifty passed over in twos and threes ; and this morning we observed them going back again. The two horses in short-hobbles have walked off, following our tracks. They cannot have gone far, for I heard them late last night and at four this morning ; we shall be able to overtake them in 3 or 4 miles. They have eaten scarcely anything during the night. Saddled, and followed after them. They left the tracks a short distance from the camp, and kept about 200 yards from them for nearly a mile and a half. We overtook them in $3\frac{1}{2}$ miles, standing under the shade of a tree. Unhobbled, and drove them on before us. At 12 o'clock arrived at Lawson Creek. Had great difficulty in preventing the horses from drinking too much, and, as there are other holes down the creek, I gave a little at a time to each. Found that Mr. Kekwick had moved with the party. Followed them, and at $3\frac{1}{2}$ miles w.s.w. arrived at their camp, and allowed the horses to drink as much as they chose. Poor brutes ! they have had very hard work—80 miles over as heavy a country as could be travelled over, and under a burning sun, without a drop of water. Three of them were those I had on my former journeys ; I could depend upon them : the rest were the best I could pick from the other lot. They have all stood the journey very well, but could not have done another day without water. Natives seem to have been about this water lately, but we have not seen one since leaving our spitting friend on the Hugh. Wind E.

Thursday, May 23.—Lawson Creek. Started 7.45 A.M., course 315° , with Thring, Woodforde, and seven fresh horses. At 14 miles came across a splendid reach of water, about 150 yards wide—how long I do not know, as we cannot see the end of it. It is a splendid sheet of water, and is certainly the gem of Sturt Plains. I have decided at once on returning, and bringing the party up to it, as it is a feature that must be carefully examined ; for it may be the source of the Camfield, or some river that may lead me through. On approaching it, I saw a large flock of pelicans, which leads me to think that there may be a lake in its vicinity. There are mussels and periwinkles in it ; judging from the shells on the banks, the natives must consume a large quantity. The gum-trees round it are not very large. The first 10 miles of that part of the plain travelled over to-day is full of large deep holes and cracks ; black alluvial soil, covered with grass, with young gum-trees thicker as we approached the water. This I have honoured by the name of Newcastle Water, after his Grace the Duke of Newcastle, Secretary for the Colonies. Duck,

native companion, white crane, and sacred ibis abound here. Returned to bring the party up to-morrow. Wind S.E.

Friday, May 24.—Lawson Creek. Started at 8 A.M. for Newcastle Water; arrived at noon; camped. Sent Mr. Kekwick to the north-east and Thring to the west to see the length of it. I have had the depth tried. It is about 6 feet deep 10 yards from the bank, and in the middle 17 feet; I should say it was permanent. Thring found it still the same at 3 miles west; Mr. Kekwick returned after following it for 4 miles. At 2 miles there is a break in it; at 4 miles it is more of a creek coming from the north-east—gum-trees much larger. Woodforde succeeded in catching four fish about 10 inches long, something resembling the whiting. I had one cooked for tea; the skin was as tough as a piece of leather, but the inside was really good—as fine a fish as I have ever eaten. To-morrow I shall follow the water to the west; its bed is limestone. Wind S.E., with a few clouds. Lat. $17^{\circ} 36' 40''$.

Saturday, May 25.—Newcastle Water, Sturt Plains. Started at 7.50 A.M., and followed the water 9 miles round; camped. It still continues, but is now a chain of ponds. As I can see some rising ground N.N.E., about 4 miles distant, I have camped the party, and taken Thring with me; have gone on to see what the country is before us. At 4 miles we found that the first part of the rise is stony, but on the top it is sandy table-land covered with thick scrub. The view is obstructed to the E.N.E. to N. by it; but to the N.W. and W. there is an appearance of rising ground, thickly wooded, about 20 miles off. Wind W.; lat. $17^{\circ} 30' 30''$.

Sunday, May 26.—Newcastle Water, Sturt Plains. This morning we were visited by seven natives, tall, powerful-made fellows. At first they seemed inclined for mischief, making all manner of gestures, and shaking their boomerangs, waddies, &c. We made friendly signs to them, inviting them to come nearer; they gradually approached, and Mr. Kekwick and Lawrence got quite close to them; in a short time they appeared to be quite friendly. I felt alarmed for the safety of J. Woodforde (who had gone down the water in search of ducks, and in the direction from which they had come), and endeavoured to make them friends by giving them pieces of handkerchiefs, &c. During the time we were talking with them I heard the distant report of his gun; at the same time Thring and Masters returned from collecting the horses that were missing; I told them to remain until the natives were gone, as I wished to keep them as long as possible to give Woodforde a chance of coming up before they left us; shortly afterwards they went off apparently quite friendly. Sent Thring and Wall to round up the horses which were close at hand, and while they were doing so the natives again returned, running quite close up to the camp, and setting fire to the grass. It was now evident

they meant mischief. I think they must have seen or heard Woodforde, and have lit the grass in order to engage our attention from him. I felt very much inclined to fire upon them, but desisted, as I feared they would revenge themselves on him in their retreat; they did very little injury by their fire, which we succeeded in putting out. By signs I ordered them to be off, and after much bother they left us, setting fire to the grass as they went along. I now ordered Thring and Wall to go and with all speed to protect Woodforde. In about twenty minutes he came into the camp. After leaving us they had attacked him, throwing several boomerangs and waddies at him. He had only one barrel of his gun loaded with shot; they all spread out and surrounded him, gradually approaching from all sides. One fellow got within 5 yards of him, and was in the act of aiming his boomerang at him; seeing it was useless to withhold any longer, while the black was in the act of throwing, he gave him the contents of his gun in his face, and made for the camp. In a short time Thring and Wall returned at full speed; they had passed where he was, and hearing the report of his gun, made for the place, overtook the blacks, gave chase, and made them drop the powder-flasks and ducks (which Woodforde had laid down before firing when they attacked him); knowing them to be his, they gave up the chase to look for him, but seeing nothing of him, and two of the natives supporting one apparently wounded, they returned to the camp, where they saw him all safe, relating his adventure; his shot-belt still missing, I sent Thring and him to look for it, and to bring up the missing horses which they had seen. Wind variable; cloudy.

Monday, May 27.—Newcastle Water, Sturt Plains. Started at 8:10 A.M., course 335° ; at 10:20 changed to north; at 1:20 P.M. changed to 90° ; and at 1 mile found water; gave the horses some, and proceeded N.N.E.; and at 3:40 changed to 90° to some gums. At $1\frac{1}{2}$ miles camped; the gums turn out to be thick wood. I went N.N.W. this morning, with the expectation of meeting with water, or rather a chain of ponds; at 4 miles I could see nothing of them; and, as we were getting into a very thick scrub of lancewood, I changed to north; at 10 miles on that course, still seeing nothing of them, I changed to east; and at 1 mile came upon them; found water, and followed them; their course now 20° ; at 1 mile found another pond; in a short time lost the bed of them in a thick wooded plain. Found a native path running nearly in my course; followed it, thinking it would lead me to some other water, but in a few miles it became invisible. I continued on the same course for 9 miles, and found myself on Sturt Plains, with belts of thick wood and scrub; to the north, nothing visible but open plains; to north-east, apparently thick wood or scrub; to north-west and west, apparently scrubby sand-

hills. The ponds seem to drain this portion of the plains. Changed to east, to what seemed to be large gum-trees, thinking there might be a creek; arriving there, I found them to be stunted gums on the edge of the plain. There is no hope of succeeding in this quarter; camped without water. Wind E.; lat. $17^{\circ} 12' 30''$.

Tuesday, May 28.—Sturt Open Plain, north. Fourteen of the horses missing this morning before sunrise. From the highest tree nothing is to be seen from east to north and north-west but immense open grassy plains, without a tree on them; no hope of water. I must go back to the ponds, and try again to the westward. Did not find the horses until 9:30 A.M., and started at 10. I observed very large flocks of pigeons coming in clouds from the plains in every direction towards the ponds. Some time afterwards we saw them coming back and flying away into the plains as far as the eye can reach, apparently to feed. Arrived at the water at 1:30 P.M. Wind E.N.E.

Wednesday, May 29.—Chain of Ponds. Started at 7:20 A.M., with Thring, Woodforde, and Wall, and nine horses, to follow a native track which is leading to the westward. At 9:20 made the track, its course W.N.W. At 28 miles camped without water. The track led us into very thick wood and scrub, and at 5 miles became invisible. I still continued on the same bearing through the scrub. We have again met with the mulga, a little different from what we have seen before, growing very straight, from 30 to 40 feet high, bark stringy, the leaf much larger and thicker; amongst it is the hedge-tree; we had 7 miles of it very dense, when we again met with an open plain. At 3 miles entered another dense wood and scrub, like that passed through in the morning. To-day's journey has been over plains of grass, through forest and scrub, without water. In the last 5 miles we passed through a little spinifex, and the soil is becoming sandy. Wind S.

Thursday, May 30.—Sturt Plains. As I can see no hope of water, I will leave Woodforde and Wall with the horses, take Thring with me, and proceed 10 miles, to see if there will be a change in that distance. Went into a terrible thick wood and scrub for $11\frac{1}{2}$ miles, without the least sign of a change; the scrub, in fact, becoming more dense, it is scarcely penetrable. I sent Thring up one of the tallest trees; nothing to be seen but a fearful dense wood and scrub all round; again I am forced to retreat through want of water. The last 5 miles of the 11, the soil is becoming very sandy, with spinifex and a little grass. It is impossible to say in which way the country dips, for, in 45 miles travelled over, we have not seen the least sign of a watershed, it is so level. Returned to where I left the others, followed our tracks back, and at 11 miles camped; horses nearly done up with heavy travelling and the heat of the sun, which is excessive. It is very

vexing and dispiriting to be forced back with only a little more than 100 miles between Mr. Gregory's last camp on the Camfield and me. If I could have found water near the end of this journey, I think I could have forced the rest. It is very galling to be turned back after trying so many times. Wind E.

Friday, May 31.—Sturt Plains. Not having sufficient tethers for all the horses, we had to short-hobble two, and tie their heads to their hobbles; and in the morning they were gone. I suppose they must have broken their hobbles or fastenings; they will most likely make on to our outward tracks; I have sent Thring and Woodforde to follow them up, while Wall and I, with the other horses, proceed on our way to the camp; in two hours they made the tracks before us. I then pushed on as hard as I could get the horses to go; being very anxious about the safety of the party—for, on the first day that I left them, at about 7 miles, we passed fourteen or fifteen natives going in the direction of their camp; I also observed, this morning, that they had been running our tracks both backwards and forwards; at 3 o'clock we arrived, and found all safe; they have not been visited by them, although I observed the prints of their feet in our tracks, a short distance from the camp. It was as much as some of our horses could do to reach the camp. The day has been excessively hot, from N.N.E., with clouds. Lat. $17^{\circ} 7'$.

Saturday, June 1.—Chain of Ponds. I must rest the horses to-day and to-morrow, for they look very miserable; our long. is $133^{\circ} 40' 45''$. Before leaving the Ponds I shall try once more to the westward—starting from a point 3 miles west of my first camp on them. To try from this for the Gulf of Carpentaria, I believe to be hopeless: for the plain seems to be without end and without water. If I could see the least sign of a hill, or hope of finding water, I would try it; but there is none—if there is a passage it must be to the south of this. Wind variable, with clouds.

Sunday, June 2.—Chain of Ponds. The day has again been very hot. Wind variable.

Monday, June 3.—Chain of Ponds. Started back to the commencement of the Chain of Ponds and camped. During the day the sky has been overcast with heavy clouds; it has much the appearance of rain. Wind S.E.

Tuesday, June 4.—Chain of Ponds. Last night one of the horses met with an accident in going down to drink at the water-hole; he went into a boggy place, got his hind foot fastened in his hobbles, from which he could not extricate himself, and was drowned before we observed and could save him. This is another great loss, for he was a good pack-horse, and was one that I intended taking on my next trip to the westward. At about 8 P.M. it began to rain, and continued the whole night, coming from the east and

E.S.E.; it still continues without any sign of a break. The ground has become so soft, that when walking we sink up to the ankle, and the horses can scarcely move in it; at sundown there is no appearance of a change; it has rained without intermission the whole of last night and to-day. I do not know what effect this will have on my further progress, for now it is impossible to travel; the horses in feeding are already sinking above their knees. Wind and rain from E. and E.S.E.

Wednesday, June 5.—Chain of Ponds. There is a little sign of a break in the clouds this morning. The rain has continued the whole night. Ground very soft; it has become about the thickness of cream. The horses can scarcely get about to feed. Sundown.—It has been showery all day; sky overcast; clouds and rain from same direction, south-east. In the afternoon some natives made their appearance, at about 600 yards' distance. As the rain had damped the cartridges, I caused the rifles to be fired off in that direction; and, as the bullets struck the trees close to them, they thought it best to retreat as fast as possible, yelling as they went.

Thursday, June 6.—Chain of Ponds. During the night it has been stormy, with showers of rain, and is still the same this morning. Sundown—Still stormy, with a few drops of rain. Wind E.

Friday, June 7.—Chain of Ponds. During the night the rain ceased, and this morning is quite bright. Ground so soft that it is impossible to travel. Lat. $17^{\circ} 35' 25''$. Sent Thring some miles to the west, to see in what state the country is; if fit for us to proceed, and if he can see any water that I could move the party to, for I do not like this place; if more rain falls, it will lock us in altogether; neither do I like leaving the party with so many natives about. At 1 o'clock he returned. The ground was so heavy that he had to turn at 5 miles. He could see no water, but a number of native tracks going to and coming from the west. I shall be obliged to leave the party here, and on Monday try another trip to the west. If I find water, I shall return and take them to it. The day has been clear, but at sundown it is again cloudy. Clouds from north-west. Wind from E.

Saturday, June 8.—Chain of Ponds. This morning it has again cleared off, and there is every appearance of fine weather. If it holds this way, I shall be able to travel on Monday. Sundown, a few clouds. Wind S.E.

Sunday, June 9.—Chain of Ponds. The day has again been fine. Wind still S.E.

Monday, June 10.—Chain of Ponds. Started at 7-55 A.M., course 275° , with Thring, Woodforde, and Wall; nine horses, and fourteen days' provisions. The first 5 miles was over a grassy plain, with stunted gum and other trees. It was very soft, the horses sinking up to their knees. We met with a little rain water

at 3 miles, where the soil became sandy; continued to be more so as we advanced, with lancewood and other scrubs growing upon it. At 14 miles gained the top of a sand-rise, which seems to be the termination of the sandhills that I turned back from on my west course south of this. From here the country seems to be a dense forest and scrub, no rising ground visible. Camped at 5 P.M., distance 32 miles. The whole journey from the sand-hills has been through a dense forest of scrubs of all kinds—hedge-tree, gum, mulga, lancewood, &c. We have had great difficulty in forcing the horses through it so far—they are very tired. It is the thickest scrub I have yet been in. Ground very soft; heavy travelling over, with the exception of the last 5 miles, where little rain seems to have fallen. I am afraid this will be another hopeless journey. I fully expected to have got water to-night from the recent rains, but there is not a drop. The country is such that the surface cannot retain it, were it to fall in much larger quantities. I shall try a little farther on to-morrow. We are obliged to tie the horses up to-night, as there is neither water nor feed. We cannot tether them; and if we let them go in hobbles, the scrub and forest are so thick that we would not see them again before they got back to water. I had a hole dug, to see if any rain had fallen, and found that it had penetrated 2 feet below the surface, under which it is quite dry. Wind E.

Tuesday, June 11.—Dense forest and scrub. Leaving Woodforde, Wall, and the pack-horses, I took Thring with me, and proceeded on the same course to see if I can get through the horrid forest and scrub, or meet with a change of country, or find some water. At 2 miles we came upon some grass again, which continued, and at another mile the forest became much more open and splendidly grassed, which again revived my sinking hopes; but alas! it only lasted about 2 miles, when we again entered the forest thicker than ever. At 11 miles it became so dense that it was nearly impenetrable. The horses would not face it; when forced, they made a rush through, tearing everything we had on, and wounding us severely, by running against the dead timber (which is as sharp as a lancet) and through the branches. I saw that it was hopeless to face through any farther. Not a drop of water have we seen, although the ground is quite moist—the horses sinking above the fetlock. The soil is red and sandy; the mulga from 30 to 40 feet high and very straight; the bark has a stringy appearance. There is a great quantity of it lying dead on the ground, which causes travelling to become very difficult; I therefore returned to where I left Woodforde and Wall, and came back 10 miles on yesterday's journey and camped. This morning about 5-30 we observed a comet bearing 110° ; length of tail 10° , and 10° above the horizon. Wind S.E.

Wednesday, June 12.—Western dense forest and scrub. Proceeded to camp and found all well. This is the third long journey that I have tried to make the Victoria in this latitude, but have been driven back every time by the same description of country and the want of water. There is not the least appearance of rising ground, or a change in the country—nothing but the same dismal, dreary forest throughout; it may in all probability continue to Mr. Gregory's last camp on the Camfield; my farthest point has been within 100 miles of it. I would have proceeded farther, but my horses are unable to do it—they look as if they had done a month's excessive work, from their feet being so dry, the forest so thick, and the want of water—or could I have seen the least sign of a change, or rising ground. Thus end my hopes of reaching the Victoria in this latitude, which is a very great disappointment. I should have dug wells if my party had been larger, and I had the means of conveying water to those that were sinking. I think I could accomplish it in that way; but by doing so, I should have to divide the party in three, one sinking, one carrying water, and one at the camp, which would be too small a number where the natives appear to be so hostile. I have not the least doubt that water could be obtained at a moderate depth, near the end of my journeys, amongst the long thick timber, which seems to be the lowest part of the country; I had no idea of meeting with such an impediment as the plains and heavy scrub have proved to be. For a telegraphic communication I should think that three or four wells would overcome this difficulty and the want of water, and the forest could be penetrated by cutting a line through and burning it; in all probability there is water to be found nearer than this in the Camfield, Mr. Gregory's last camp, somewhere about its sources, which might be 30 miles nearer. Wind S.E. Country drying up very fast.

Thursday, June 13.—Chain of Ponds. To-day I shall move the camp to the easternmost part of Newcastle Water, and now that rain has come from the east, I shall try if I can cross Sturt Plains, and endeavour to reach the Gulf of Carpentaria. My provisions are now getting very short: we are reduced to 4 lbs. of flour and 1 lb. of dried meat per man per week, which is beginning to show the effects of starvation upon some of them; but I can leave nothing untried where there is the least shadow of a chance of gaining the desired object. Started at 9.40 A.M.; at $3\frac{1}{2}$ miles passed our first camp on Newcastle Water; at $8\frac{1}{2}$ miles camped at the last water to the eastward: the ground is firmer than I expected; travelling good; the large part of the water is reduced 2 inches since 24th ult.; the late rains seem to have had no effect on it. Wind S.E.

Friday, June 14.—East end of Newcastle Water. Started

with Thring, Woodforde, and Wall, one month's provisions and ten horses, at 7.45 A.M.; course 60° ; at 2 miles crossed our former tracks, on the top of the sandy table-land, and after leaving it we again got on the open plains, black alluvial soil, covered with grass, deep holes and cracks into which the horses are continually falling on their noses, and running the risk of breaking our necks. These plains have swallowed up every drop of rain that has fallen. The extent of the plain is 7 miles. We then entered a thick wooded country of the same description as the western forest, being equally thick, if not thicker, and as difficult to penetrate. This continued for 13 miles, when we met with another small plain, about $\frac{1}{2}$ a mile wide, but opening out wider to the north-west and south; not a drop of water have we met since leaving Newcastle Water, a distance of about 30 miles, except a little rain-water about 3 miles east of it. The plains are quite dry, scarcely showing that rain has fallen. Camped. The horses have had a hard day's work, and are very tired. I wish I could have found water for them to-night. Lat. $17^{\circ} 26' 20''$. Wind S.E.

Saturday, June 15.—North-east. Small plains. Sturt Plains. Started at 7.30 A.M.; course 60° , through another 10 miles of very thick forest, the thickest we have yet seen. At 11 miles came again upon the large open grassy plain, at the point where I turned on 21st ult. I expected to have found some rain-water here, this being the only place in all the plain I have seen that is likely to retain it. Sent Thring and Woodforde in different directions, while I proceeded in another, to see if we could find any, but not a drop could we see. It has been all swallowed up by the ground, which is now again dry and dusty. It must take an immense quantity to saturate it, and leave any on the surface; and if that were to be the case, the country would become so soft it would be quite impassable. I am again forced to turn—it is quite hopeless to attempt it any farther. It would be sacrificing our horses, and perhaps our own lives, without the least prospect of attaining our end. If I could see rising ground, however small, or a change in the country to justify my risking everything, I would do so in a moment. I only wish there was. I have tried my horses to their utmost; even my old horses, that are inured to hardship, are unable to be longer than three days without water, owing to the heat of the sun, the dryness of the feed, and the softness of the country. We saw a few cockatoos and pigeons. There might be water within a short distance, but none can we see or find: for, on my course, 20° west of north, I passed within 2 miles of Newcastle Water, where the main camp is now, but could not see it. It would require a long time to examine this country for water—there are so many clumps of trees, and strips of scrub on the plain, where water might be, that it would take upwards of

twelve months to examine them all. At sundown camped 15 miles from the main camp. Horses look very bad. It has been very heavy travelling, over rotten ground, and tearing through thick wood and scrub, which has skinned our legs from the knees to the ankles, and caused no little pain. Wind variable.

Sunday, June 16.—Sturt Plains, east. Proceeded to the camp, where I found all well. No natives had been near them. This is very disheartening work to be forced to retreat so frequently without a vestige of a hope; and to be so near, and be baffled through want of water. I shall now proceed to the south, and try once more to round that horrid thick western forest: it is now my only hope; if that fails, I shall have to return. I am doubtful of the water in Ashburton Range if no rain has fallen there; those hills are the last of the rising ground within range of vision, which ends in about lat. $17^{\circ} 14'$. From s.s.e. round the compass to s.s.w. nothing but dense forest and Sturt Plains. Wind s.e.

Monday, June 17.—Newcastle Water, east. Returned to the Lawson and camped. Little rain seems to have fallen here. I kept a little to the west of my former tracks to see the nature of the large open plain. It is completely matted with grass, having large deep holes and cracks, and is as dry as if no rain had fallen for months. Wind s.e.

Tuesday, June 18.—Lawson Creek. Proceeded to Hunter Creek. Tracks of natives upon ours to Hawker Creek. Light winds, variable.

Wednesday, June 19.—Hawker Creek. Although the water-holes in this creek are full from recent rains, the water is very hard, evidently showing it must come from a spring in the hills. Proceeded to the Hunter along the foot of the hills, and at 9 miles crossed the large gum-creek, where I watered the horses on my north course: this I have named Powell Creek, after J. W. Powell, Esq., of Clare. At 20 miles crossed another gum-creek, which I have named Gleeson Creek, after E. B. Gleeson, Esq., J.P., of Clare. Camped on the Hunter. Between this and Hawker Creek we crossed 11 gum-creeks with water in them. The country passed over is not so good, being close to the hills: it is scrubby, and generally covered with spinifex. Wind s.e.

Thursday, June 20.—Hunter Creek. Three horses missing; could not be found until too late to reach the other water to-night. Wind calm.

Friday, June 21.—Hunter Creek. Proceeded to the water under Mount Primrose, over stony hills, the highest of which I have named Mount Shillinglaw, after — Shillinglaw, Esq., F.R.C.S., of Melbourne, who kindly presented me with Flinders's Charts of North Australia. Wind calm. The gum-creek on which we are

now camped, I have named Carruthers Creek, after John Carruthers, Esq., of Adelaide. Calm.

Saturday, June 22.—Carruthers Creek. Proceeded to Tomkinson Creek, where I left the two horses. I will there rest the horses a day, and have those shod which I intend to take with me: the last two days have been over very stony country, which has made some of the horses quite lame. I am now running short of shoes; we can see nothing of the two horses about our old camp. Light wind from N.E., with a few clouds; very hot in the middle of the day, evenings and mornings cold.

Sunday, June 23.—Tomkinson Creek. Sent Thring and Woodforde down the creek, and Masters up into the open plain, to see if they could find the horses on their tracks: in the afternoon they returned unsuccessful, except Masters, who had seen their tracks when the ground was boggy. Recent tracks of natives were also seen; if they have not frightened them away, they will not be far off. I have instructed Sullivan to follow their tracks, and try to find them during my absence. Wind N.E., with a few clouds; the sun is very hot in the middle of the day.

Monday, June 24.—Tomkinson Creek. Started with Thring, Masters, and Lawrence, and 10 horses with 14 days' provisions, at 7:40 A.M.; course 270° E. We crossed the plain and the creek several times; at 12:20, 15 miles, ascended a stony rise, and saw that the creek emptied itself into an open grassy plain, about 2 miles north of us. Proceeded on the same course over a gum plain covered with grass for 5 miles. The country then became sandy soil, slightly undulating with ironstone, gravel, spinifex, gums, and occasionally a little scrub, which continued throughout the day. Camped without water; very little feed for the horses, it being nearly all spinifex. Distance, 28 miles; wind W., a few clouds.

Tuesday, June 25.—Spinifex and Gum Plain, west. Started on same course, 270° , at 7:40 A.M.; camped at 27 miles. The country travelled through to-day is bad, red sandy light soil, covered with spinifex, slightly undulating, and having iron gravel upon it. Scarcely a blade of grass to be seen: some gum-trees and a low scrub of different sorts. I seem to have got to the south of the dense forest, but into a poorer country: not a drop of water or a water-course have we seen since we left Tomkinson Creek. We have crossed two or three low rises of ironstone gravel. Not having the dense forest to tear through has induced me to go on all day in the hope of meeting with a change; but at the end of the day there seems as little likelihood as when we first came upon it, and it may continue to the river. I am again forced to return disappointed. There is no hope of making the river now; it must be done from Newcastle Water with wells. I wish that I had

twelve months' provisions and convenience for carrying water; I should then be enabled to do it. Wind E.

Wednesday, June 26.—Spinifex and Gum Plain. Started at 7 A.M. back towards Tomkinson Creek. At dusk found some water on the small plain into which the creek empties itself—camped; distance travelled to-day, 40 miles. One of the horses completely done up; I am fortunate in finding this water, for another night without it, and I would have lost some of them: I am also glad we had a cool day—only two hours' heat. The horses have travelled 100 miles without water, and the country being sandy, made it very heavy walking for them. Wind E.

Thursday, June 27.—Tomkinson Creek. Started for the camp, and arrived at noon. Sullivan had gone after the horses, and lost himself for three days and two nights; not making his appearance the first night, Mr. Kekwick sent J. Woodforde in search of him from south-east to north; the second night, not returning, Mr. Kekwick and Woodforde went out in another direction to try if they could cut his tracks, but were again unsuccessful. At about 3 A.M. he came into the camp perfectly bewildered, and did not seem to recognise any one. From what we can learn from him he must have gone to the south instead of the east, where the tracks of the two horses were seen: on the first night he came close to the camp—saw the other horses feeding, but could not find them. He can give no account of where he went the next day and night; on the third day he cut my outward tracks to the west, and the horse brought him to the camp. I observed his horse's tracks upon ours this morning, about 10 miles down the creek, and could not imagine how they came there. J. Woodforde found the two horses he went in search of within 3 miles of the camp—they had not left the creek. The cream-coloured one had improved very much; but "Reformer" still looks miserable—I think he must be ill. Wind N., with a few clouds coming from the same direction.

Friday, June 28.—Tomkinson Creek. Shoeing horses and preparing for another start: I shall try once more to make the Gulf of Carpentaria from this. There may be a chance of my being able to round Sturt Plains to the east or north-east. Wind varying from S.E. to N.

Saturday, June 29.—Tomkinson Creek. Shoeing horses, &c. Wind S.E.; clouds all gone.

Sunday, June 30.—Tomkinson Creek. Wind N.E.

Monday, July 1.—Tomkinson Creek. Started at 8.10 A.M., course 54°, with Thring, Woodforde, and Masters. At 11.20 (11 miles), top of a high hill which I named Mount Hawker, after the Honourable George C. Hawker, Speaker of the House of Assembly, S. A. At 12.45 (4 miles) struck a large creek, its course a little

east of north, which I have named McKinlay Creek, after John McKinlay, Esq. The first part of the journey is over stony undulations, gradually rising until we reach the top of Mount Hawker, the view from which is not very extensive on our course, as it is intercepted by stony spurs of the range nearly the same height, about 800 feet, and are very rocky and precipitous. They are composed of sandstone, quartz, iron, limestone, and hard, white, flinty rocks. The sandstone predominates. We descended with great difficulty, crossed McKinlay Creek, and at 5 miles ascended another high hill, which I have named Mount Hall, after the Honourable George Hall. From this our view is most extensive, over a complete sea of white grassy plains; at about 15 or 20 miles south-east are the terminations of other spurs of this range; beyond them nothing is visible on the horizon but white grassy plains: to the east and north-east the same. To the north, apparently a strip of dense scrub and forest, which seems to end about north-east, beyond which, in the far distance, we can see the large white grassy plain where I turned back from on the 21st of May and 15th of June. No rising ground visible except the hills of Ashburton Range to north-west and south-east. Descended towards the plains over stony rises; gum-tree, lancewood, and other scrub and spinifex. At 5 miles reached the plain: it is of the same description as the other parts I have been over. No appearance of water: it is hopeless to proceed farther; it will only be rendering my return more difficult, by reducing the strength of my horses, without the slightest hope of success. All hope of gaining the Gulf without wells is now gone: I have, therefore, turned back to a small plain (4 miles), searched round it, and in one of the small creeks found a little rain-water, at which I have camped. Wind s.

Tuesday, July 2.—Loveday Creek. This creek I have named Loveday Creek, after R. J. Loveday, Esq., lithographer to the South Australian Government. Returned towards the camp: on reaching McKinlay Creek, I was informed by J. Woodforde that Masters had remained behind about 6 miles back, and had not yet come up. This is against my strict orders, which are—that no one shall leave the party without informing me, that I may halt and wait for them: I have sent Thring back to one of the hills to fire off a gun, and see if he is to be seen, as I have left my outward tracks to avoid crossing Mount Hall, and the tracks are very difficult to be seen over such stony country; I am afraid that he is lost. In an hour and a half Thring returned—he can see nothing of him: he cut our former tracks, but can see nothing of his on them. My conjectures, I fear, are too true—if he has missed the tracks, it is a thousand chances to one if he is ever found again: to track a single horse is impossible. I proceeded towards Mount Hawker,

and camped on my outward tracks at a remarkable gorge that we had come through: sent Thring back to the top of Mount Hall to raise a smoke, to remain there some time, and see if he comes up—if not, he is to proceed to our last night's camp, there to remain all night, in case he should go there—while I and Woodforde raised another smoke on top of Mount Hawker. A little after 2 P.M. Thring returned with him: he found him on a hill near Mount Hall, looking for the tracks; he was quite bewildered, and in a great state of excitement. I am most thankful that he is found. The account that he gives is, that his horse slipped the reins out of his hand and that he was unable to catch him for some time; and when he did so, he was unable to find our tracks, or to track his own horse back, and he became quite confused: he seems to be most thankful for his narrow escape. As it is too late to reach the camp, I shall remain here to-night. Wind w.

Wednesday, July 3.—Under Mount Hawker. Proceeded to the camp on the Tomkinson; found all right, with the exception of one of the horses (Reformer), which cannot be found; he is one of the two that I left here formerly, and was looking so ill when we found him. He was last seen on Monday night, when he looked miserable; I have sent three men in search of him. Wind variable.

Thursday, July 4.—The Tomkinson. Started at 8:20 A.M., course 300°, with Woodforde, Thring, and Masters, ten horses, and a month's provisions, to try once more to make the Victoria; between my first and last attempts, I may succeed—I am very unwilling to return without trying all that is within my power. At 3 miles we left the plains, and proceeded over stony rises for 2 miles; the country then became sandy, with gum, spinifex, and lancewood scrub, not difficult to get through; there is no grass. At 25 miles came to a little, and not sure of coming upon any more soon, I have camped. We have seen no water since leaving the creek. Lat. 18° 25' 40"; wind s.e.

Friday, July 5.—Spinifex and gum plains. Started at 7:50 A.M., course 360°, to find water. At 9:10 (5 miles) struck a creek with water, followed it down, course 285°, and at 8 miles camped on the last water. The banks, in places, have good feed upon them; but there is a great deal of spinifex and scrub. The creek is getting narrower, and, as the horses had but little to eat last night, I shall give them the remainder of the day here, for there is no telling when they will get another good feed. Day exceedingly hot, horses covered with sweat. This I have named Burke Creek, after my brother explorer, — Burke, Esq., of Melbourne. On camping, I saw a remarkable bird fly up; I sent Woodforde to try and shoot him, which he did; it is of a dark brown colour, and spotted like the landrail; the tail feathers are nine in number,

and 12 inches long. I have had it skinned, and will endeavour to take it to Adelaide. Thring, Woodforde, and Masters cooked the body and ate it: they had scarcely finished when they were seized with violent vomiting, but in a few minutes they were all right again. Wind calm; lat. $18^{\circ} 19' 30''$.

Saturday, July 6.—Burke Creek. Started at 7.45 A.M. same course, to follow the creek (285°); at 3 miles it was lost in a gum grassy plain; changed to 300° . On this course the plain continued for 3 miles; it then became sandy soil, with spinifex, gums, and scrub. Crossed a low sandhill at 14 miles; descended into another low grassy plain subject to inundation, which, I suppose, receives Hunter Creek. It continued for 2 miles, at the end of which we again ascended a sandy rise, on the top of which the country becomes a sandy tableland, and continues so the rest of the day's journey. Camped without water, and with very little grass. The tableland is spinifex, gums, and scrub, in some places very difficult to get through. Distance 30 miles; wind south-east; lat. $18^{\circ} 7' 5''$. At 7 P.M. I observed the comet, 5° above the horizon, bearing 15° W. of N., the nucleus more hazy, and the tail much longer. Calm.

Sunday, July 7.—West Sandy Tableland. Started at 8 A.M., same course (300°); at 11.0, 11 miles. Met with a small grassy plain at 12.40, another at 1.30 P.M.; they are only a few acres in extent. At 3 P.M. we are getting into dense scrub; and, as I can see some distance on before, being on one of the slight undulations, I cannot see the slightest hope of obtaining water: there is no change, no rising ground visible. It is hopeless to continue such sandy country, as it can never hold water on the surface. We dug five feet, in one of the small plains, but came to the clay without finding water, or even moisture. There is not a mouthful of grass for the horses to eat; the whole of the journey, with the exception of the small grassy plains, is spinifex, gums, and scrub. I shall have to retreat to the last plain we passed through, to get feed for the horses, which are looking very bad. The travelling has been heavy, tearing through thick scrub, which in some places has been burned; this makes it very rough for them. I must now give up all hope of reaching Victoria, and am unwillingly forced to return, my horses being nearly worn out. Wind variable; distance 25 miles.

Monday, July 8.—Small grass plain in scrub. Started at break of day and continued until 4.30 P.M. Meeting with a little grass, camped, some of the horses unable to go farther. Wind s.

Tuesday, July 9.—Sandy tableland. Started at sunrise and arrived at Burke Creek. At 11 A.M. turned the horses out to feed for two hours, and proceeded up the creek to where I first struck it. Camped. At a little more than a mile down the creek

from here, there is a course of concrete ironstone running across the creek which forms a large pond of water nearly a mile in length, apparently deep and permanent. Wind w.

Wednesday, July 10.—Burke Creek. Shortly after sunrise proceeded toward the main camp, and arrived there at 3 P.M. Found all well. The natives have been about. They attacked Wall while in search of the missing horse; he and his horse narrowly escaped being hit by their boomerangs. The missing horse cannot be found. I suppose that he has crept into some bushes, and died; for the night before he was missed, he left the other horses and came to the camp-fire; he appeared to be very stupid, and for some time they could not get him away; when they did so he went off reeling. Wind s.w.

Thursday, July 11.—Tomkinson Creek. Shoeing horses, and repairing saddles and bags to carry our provisions back. We have now run out of everything for that purpose, and are obliged to make all sorts of shifts. The two tarpaulings that I brought from Mr. Chambers's station for mending the bags are all used up some time ago, and nearly all the spare bags; the sewing-twine has been used, and we are obliged to make some from old bags. We are all nearly naked, the scrub has been so severe on our clothes; one can scarcely tell the original colour of a single garment, they are so patched. Our boots are also gone. It is with great reluctance that I am forced to return without a further trial. I should like to go back, and try from Newcastle Water, but my provisions will not allow me. I started with 30 weeks' supply at 7 lbs. of flour per week, and have now been out 26, and it will take me 10 weeks before I can reach the first station. The men are also failing, and showing the effects of short rations. I only wish I had sufficient to carry me over until the rain will fall in next March; I think I would be able to make both the Victoria and the Gulf. I had no idea when starting that the hills would terminate so soon in such extensive level country, without water, or I should have tried to make the river, and seen what the country was when I first saw the rising grounds from Mount Primrose, which are the sand and iron undulations passed over on my southernmost western journey. Before I went to Newcastle Water they completely deceived me; for from the top of the Mount they had the appearance of a high range, which I was glad to see, thinking that if the range I was then following up should cease, or if I could not find a way into the river farther north, I would be sure to get in by that distant range, which caused me to leave the Newcastle Water country sooner than I would otherwise have done; and now I have not provisions to take me back again. From what I have seen of the country to the west and south of Newcastle Water, I am of

opinion that it would be no use trying again to make the river, for I believe no water can be obtained by sinking. The country is sandy table-land, on which not a drop of water remains, and there is not a blade of grass. To the west and north-west of Newcastle Water the country is apparently lower, and I think that water could be obtained at a moderate depth. It is the shortest distance between the waters, but the greatest difficulty would be in getting through the dense forest and scrub: that, I should think, could be overcome. For a line of telegraph three or four wells would be quite sufficient. It certainly is a great disappointment to me in not being able to get through, but I believe I have left nothing untried that has been in my power to do. I have tried to make the Gulf and river both before rain fell and immediately after it had fallen; but the results were the same—*unsuccessful*. Even after the rain I could not get a step farther than before it. I shall commence my homeward journey to-morrow morning. Wind s. The horses have had a severe trial from the long journeys they have made, and the great hardships and privations they have undergone. On my last journey they were 106 hours without water.

RETURN.

Friday, July 12.—Tomkinson Creek. The horse Reformer cannot be found, dead or alive. Started 9-10 A.M., course 180° . At 8 miles changed to south-east, following our former tracks, and at 25 miles arrived at our former camp on Morphett Creek; plenty of water. Wind s. Mornings and evenings very cold, with frost.

Saturday, July 13.—Morphett Creek. Started at 8-20 A.M. across the Whittington Range, and arrived at 1-45 P.M. Camped on Attack Creek; no natives to be seen. Wind s.w.

Sunday, July 14.—Attack Creek. During the day sun very hot; wind s.w. No natives made their appearance.

Monday, July 15.—Attack Creek. Arrived at Hayward Creek. Wind s.e.

Tuesday, July 16.—Hayward Creek. Proceeded to Bishop Creek, and camped. Wind s.e.; mornings and evenings very cold.

Wednesday, July 17.—Bishop Creek. Proceeded to Tennent Creek, and camped. Wind s.e.

Thursday, July 18.—Tennent Creek. Proceeded towards Mount Samuel. Crossed the M'Douall ranges farther to the east than before; found the crossing very easy. It is composed of ironstone, granite, quartz, and slate—the granite predominating in

the main range. On the south side are immense masses of nearly pure iron. On reaching the foot of the Mount I find that the rain has not come thus far: I therefore unpacked the horses and sent them back to the large rocky waterholes in Goodiar Creek, as we have a long day's journey before us to-morrow, and the water doubtful. Wind S.E.; Mount Samuel bearing 265° .

Friday, July 19.—Mount Samuel. Proceeded towards Ann Creek, on the north side of the Murchison Range. Started at 7:30 A.M., and arrived at 3:30 P.M.; distance 28 miles. Found the water still plentiful; towards the range large holes. I now conclude that this water is permanent; little or no rain seems to have fallen here since we left it. Wind S.E.; lat. 20° .

Saturday, July 20.—Ann Creek. Rounded the Murchison Ranges, it being too rough to cross. Course 253° . Crossed Mount Blyth, and proceeded to the creek on which I camped on my former journey. Found water more to the west and camped. This I have named Thring Creek. Wind S.E.

Sunday, July 21.—Thring Creek, Murchison Ranges. Proceeded across the southern spur of the Murchison Range, which we found very steep and rugged. Arrived at the Bonney, and camped. Wind S.E.

Sunday, September 15, 1861.—Moolooloo. I shall leave to-morrow for Port Augusta, and proceed by steamer for Adelaide, leaving the party to be brought into town by Mr. Kekwick.

I cannot close my Journal without expressing my warmest thanks to my second in command, and my other companions; they have been brave, and have vied with each other in performing their duties in such a manner as to make me, at all times, feel confident that my orders were carried out to the best of their ability, and to my entire satisfaction; and I also beg to tender my best thanks to the promoters (Messrs. Chambers and Finke) and the Government for the handsome manner I was fitted out.

JOHN M'DOUALL STUART,

Leader of the Expedition.

XXV.—*Expedition to the North-West Coast of Australia.*

By F. T. GREGORY, Esq., F.R.G.S.

Communicated by the COLONIAL OFFICE.

Read, February 10, 1862.

Perth, November 18, 1861.

April 20th, 1861.—All the preliminary arrangements in Perth having been completed, and the stores and equipment of the Expedition already sent on board the barque *Dolphin*, I proceeded to Fremantle, and shipped the 10 horses that had been furnished by the settlers in this part of the colony; the remainder of the hay and water being also completed by 2 P.M., we were prepared to sail, when the agent for the vessel raised objections to our departure, on the plea that the arrangements for the payments on account of the charter were not satisfactory. Wrote accordingly by express to the private secretary for an acknowledgment that the requisite documents were complete.

21st.—Received reply from the private secretary to the effect that everything necessary had been approved of already by the Governor; the agent would not, however, allow the vessel to leave until he had actually received the first instalment on account of the charter from the Colonial Treasurer.

22nd.—Accompanied Mr. Manning and Captain Dixon to Perth, when they were informed by the Colonial Treasurer that the money would be forthcoming on the presentation of the accounts. Returned to Fremantle, where we were detained for the remainder of the day, to enable the agent to close his accounts.

23rd.—Went on board the *Dolphin* at 7 A.M., and by 11 got under weigh, with a fresh breeze from the E.N.E., and stood to the N.N.W. The portion of the exploring party embarked at Fremantle comprised the following persons:—F. T. Gregory, Commander; J. Turner, Assistant and Storekeeper; E. Brockman, W. S. Hall, and J. M'Court, Assistants; and A. James, Farrier. Supplies of flour, salt pork, dried beef, preserved meat, bacon, sugar, tea, &c., sufficient for eight months, were provided for a party of 9; 3 more volunteers and 10 horses having yet to be taken on board at Champion Bay.

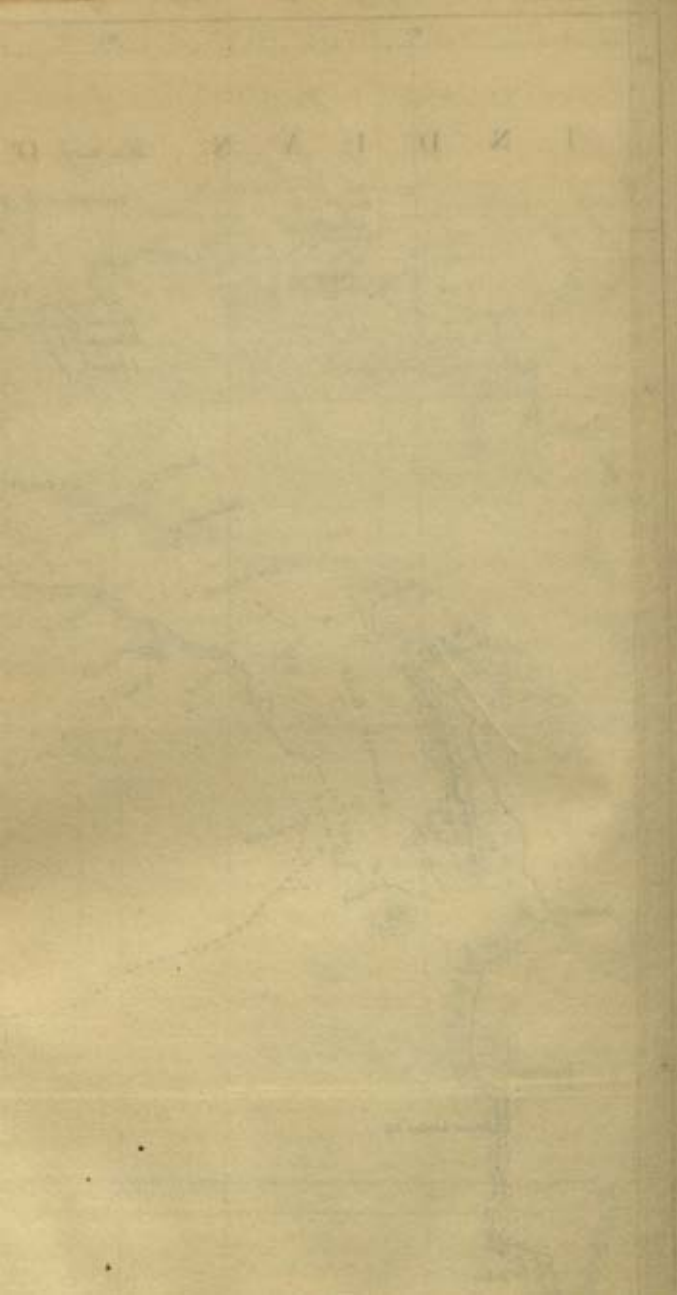
24th.—Light winds from the north; at noon sighted land, in lat. $31^{\circ} 28' 12''$ south; all hands attending to horses.

25th.—Experienced variable and contrary winds; made but little progress.

26th.—Weather cloudy, winds unfavourable; had a distant view of Mount Lesueur.

27th.—Sighted Mount Hill soon after daylight, rain and squalls





rendering it difficult to distinguish the coast. The weather clearing up, ran into Champion Bay, and came to anchor by noon, $\frac{1}{2}$ mile north of the jetty, in 4 fathoms. Landed and procured a horse from the Government Resident, and rode out to Mr. K. Brown's station.

28th.—Procured a horse for the Expedition from Mr. W. Moore, on account of Hamersley and Co., and returned with it to the Bay.

29th.—Sent round to the rest of the subscribers of horses to the Expedition. Party employed filling up ship's water-tanks.

30th.—Mr. J. Harding arrived, as a volunteer, with 2 horses from Mr. W. Burges; also Mr. M. Brown, as a volunteer, with 1 horse. The following gentlemen also sent horses:—Messrs. J. S. Davis, 2; F. Du Boulay, 1; C. Von Bibra, 1; H. Gray, 1; M. Morrissey, 1; and J. Drummond, 12 sheep. Mr. P. Walcott joined as a volunteer for the collection of specimens of natural history and botany. Ship's crew employed discharging the remainder of the cargo from England, consigned to Champion Bay.

May 1st.—With the assistance of a number of gentlemen who kindly volunteered their aid, the 10 additional horses were safely swam off to the *Dolphin*, Captain Dixon and his crew being employed landing a steam-engine. Wrote to his Excellency the Governor, reporting intention to sail to-morrow.

2nd.—Wrote to Dr. Norton Shaw, of the Royal Geographical Society, reporting progress of the Expedition. Transferred order for 20 sheep, subscribed by J. Williams, to Mr. T. Burges. Took on board 12 sheep sent by Mr. Drummond, and closed accounts at the Bay. Party fitting up mangers, &c. At 5 h. 30 m. P.M. got under weigh and stood to the north-west, the soundings for 5 miles varying from $3\frac{1}{2}$ to 7 fathoms; the sea breaking heavily for about a mile in a north direction from the end of the sheltering reef, showing a much greater extent of shoal-water than is noted on the charts. Established a routine of watches of two hours each, for the members of the Expedition to attend upon the horses.

3rd.—By observations at noon found the latitude to be $26^{\circ} 53' \text{ s.}$, long. $112^{\circ} 33' \text{ E.}$ Party preparing equipment, drying horse-slings, &c. Wind light from south-east.

4th.—Putting pack-saddles together, covering water-belts, &c.; light wind from south, ship making from 1 to 4 knots; course north by east. Increased allowance of water to horses from 4 to 5 gallons each, on account of the heat of the hold. Killed a sheep. Lat. at noon $25^{\circ} 40' \text{ s.}$, long. $112^{\circ} 1' \text{ E.}$

5th (Sunday).—Held Divine service. Passed through several drifts of seaweed at noon, in lat. $25^{\circ} 43' 34'' \text{ s.}$, long. $112^{\circ} 5' \text{ E.}$;

showing a southerly current of nearly 2 miles per hour; cloudy, with light winds from south-east and south.

6th.—At noon sighted Cape Cuvier, bearing east 20 miles; lat. $23^{\circ} 52'$, long. $112^{\circ} 53'$ E.; current of 19 miles south in 24 hours.

7th.—North-west Cape was visible at noon, bearing E. $\frac{3}{4}$ N., distant 25 miles, our lat. being 22° S., and long. $113^{\circ} 18'$ E. The Cape appears to have an elevation of 500 or 600 feet, and to be of a sandstone formation; the soil back on the hills appearing good, and clothed at this period of the year with an abundance of grass, wattles of large growth, and flooded gum-trees growing on the slopes; the character of some of the lower hills and valleys is that of a mineral district.

8th.—Passed through many patches of drifting seaweed coming from the eastward. Light south-east winds and cloudy weather. Lat. $20^{\circ} 24'$ S., long. $114^{\circ} 37'$ E. at noon.

9th.—Richie's Reef cannot be in the position shown on the charts, as we sailed over it, and saw no broken water. At noon found our lat. to be $19^{\circ} 58'$ S., and long. $115^{\circ} 23'$ E.; light winds from the south-east, and a current of $\frac{1}{2}$ mile per hour setting to the west or north-west.

10th.—At daylight sighted Legendre Island to the south-east, distant 10 miles. Ran E.N.E. till 10 A.M., with fresh breeze; tacked to south-west, with wind at E.; by noon it fell calm, having fetched to within 10 miles of the north end of Delambre Island. At 5 P.M. a light wind from the north-west enabled us to run in and drop anchor at 6 in 13 fathoms, the south end of Delambre bearing east, about 3 miles; at 11 a strong breeze sprang up from the south-east, freshening to a gale by 2 A.M. of the 11th. Tide setting to south-west, at 4 miles per hour, with a rise of 16 feet.

11th.—The gale continued to 11 A.M., when it moderated, the tide being full at about noon. Got under weigh at 1 P.M., and stood to the south-west, under top-sails, stemming a strong ebb-tide to 3 h. 30 m. P.M., when we came to anchor in 5 fathoms (sand and shells), about 3 miles from the western shore of the bay, Sloping Head bearing north by east 5 miles. The water of the bay is much discoloured, being of a deep reddish brown. In passing down the shore, we observed that the whole of what is shown on the charts as a promontory, extending to the north of Sloping Head, is an island, with a channel nearly half a mile wide, separating it from the main; to the outer portion was given the name of Dolphin Island. At 4 P.M. left the ship in the life-boat, accompanied by Captain Dixon, Mr. Hall, and 4 men, and took soundings for 6 miles to the south-west down the centre of the bay, finding 5 and 6 fathoms all the way; the water then shoaled to 3 fathoms, when, being within a mile of the head of the bay, it

became dark. Pulling about 2 miles to the south-east, it gradually shoaled to 1 foot, when we grounded, and remained there till 11 P.M., when, the tide being at the full, we pulled for the ship; but not seeing her lights by 1 A.M. on the 12th, and the men being much fatigued, we lay on our oars for an hour, and then took a stretch for 2 miles to the S.S.E., to get under the shelter of the south-east shore of the bay, when, having no anchor, we lay-to till daylight, by which time the boat had drifted into heavy rollers under the high rocky land at the south-west head of the bay; the wind having risen so much that the boat was only kept afloat by keeping her head to the sea. As we could not observe any spot at which we could land without the risk of swamping the boat and wetting our fire-arms, we continued pulling towards the ship, the ebb-tide assisting us, until 2 P.M., when, just as all hands were becoming thoroughly tired out, a boat was sent from the *Dolphin* to our relief, with a timely supply of biscuit and brandy, which, with the assistance of a tow-line, enabled us to reach the ship by 3 P.M., very thankful that we had escaped what at one time appeared likely to have proved a serious disaster.

13th.—In the morning it blew so fresh from the eastward that Captain Dixon did not like to move the vessel until 2 P.M., when we stood to the south for about 4 miles, and came to anchor in 4 fathoms. Taking the life-boat and cutter, both well manned, we pulled south to the shore about 3 miles, the water gradually shoaling, until at half a mile from the shore the boats grounded on a sand-bank, from which we walked, through mud, shells, and coral, to a belt of mangroves about 50 yards through, behind which rose a sand-bank about 30 feet high, covered with flowers and coarse grass. From this to the foot of a range of rugged metamorphic sandstone, a distance of half a mile, was an open, undulating, loamy plain, covered with grass just arriving at maturity, a few small wattles, hakea, and white gum-trees. As the sun had now set, we had only just time to ascend a few hundred feet up the rocky ridge, from which elevation could be discerned a sheet of water about a mile to the eastward, which we attempted to reach, but it became so dark that it was found better to return to the boats, which were now high and dry. By 8 P.M. the tide had risen sufficiently to admit of Captain Dixon's return to the *Dolphin*, while I remained with a portion of my own party to make a further examination in the morning; the leaky state of the cutter keeping one of us baling through the night.

14th.—With Messrs. Turner, Brown, Harding, and Brockman, landed at 7 A.M., and walked to the sheet of water observed last night, but found it only a tidal inlet, terminating in a salt-marsh. Continuing on our course for 5 miles to the south-east, across a grassy plain, the soil being a light-brown loam, with occasional

patches of quartz and gneiss pebbles, and beds of limestone in irregular nodules, in an hour and a half arrived at a deep stony water-course, containing some small pools of brackish water. This stream was followed up to the southward about a mile, but found to be dry, and did not appear to come from a greater distance than 20 miles. This river was named the Nickol. The country to the south not being very promising we turned to the westward, recrossing the plain more to the south, passing several hollows, in which the rain-water had very recently rested, leaving a rich alluvial deposit, from which had sprung up a splendid sward of grass, which was still quite green. Not meeting with water in this direction, and the party not being yet in full training, we were glad to return to the boat, which was reached by 2 P.M.; the tide being now in, enabled her to come in close to the beach, the rise being found to be about 16 feet. By 5 h. we had returned to the ship, all tolerably well fatigued with our first day's march on shore.

15th.—Not being satisfied to land the horses on a shore devoid of water, I determined to attempt a landing in a small sandy cove in the high rocky shore on the west of the bay, which we had been afraid to enter during the gale on the 12th. Leaving the ship with two boats and provisions for the day, we pulled for the little cove about 4 miles distant, bearing west by north. For the first 3 miles the soundings did not show less than 3 fathoms, with an even sandy bottom, the last mile shoaling gradually to the beach; the landing being easily effected, as there now was but little surf. The shore was found to be generally very sandy, a low flat valley extending from the head of the cove across the isthmus about 2 miles to Mermaid Strait, where it terminated in a muddy mangrove creek. In about half an hour several wells were found, some containing rather brackish water; but one, about 8 feet deep, in a hollow under a steep range of bare volcanic and granite hills, not more than 200 yards from the beach, was found to contain an abundant supply of good water, grass being plentiful and of fine quality in the valleys under the hills. Our principal requirements being now satisfied, it only remained to bring the ship in near enough to land the horses. On our return to the *Dolphin* we found that she had been visited by two natives, who had paddled off on logs of wood, shaped like canoes, not hollow, but very buoyant, about 7 feet long and 1 foot thick, which they propelled with their hands only, their legs resting on a little rail made of small sticks driven in on each side. At first they were afraid to come on board, but on friendly signs being made, they ascended the ladder that had been put down for them. They were both fine looking men, of about forty years of age, above the middle stature, one measuring 6 feet 4 inches, and the other 5 feet 8 inches; their hair straight and black, teeth regular, and general features characteristic of the tribes on

the west coast; their bodies were rather more spare, and had not on them a vestige of clothing. The Champion Bay dialect was quite incomprehensible to them; they, however, knew the use of both biscuit and tobacco, some of which was given them. After remaining several hours on board, they took their departure for the eastern shore of the bay, distant at least 6 miles, promising by signs to repeat the visit the next day. It is worthy remark that neither of these natives were circumcised, or had lost the front tooth, as is common on this coast farther to the eastward. Their fearlessness and confidence in the good faith of Europeans would lead to the impression that this was not their first acquaintance with vessels on the coast. It was not far from this place that Captain P. P. King had a visit from natives similarly equipped more than forty years ago. While on shore to-day several new and very beautiful plants and flowers were observed, amongst them one in particular, which, without exception, is the handsomest shrub I have ever seen in Australia: in form the plant resembles a large chandelier, with a series of branches springing from a centre stem in sets of five each; on these are short erect stems a few inches apart, carrying five beautiful deep crimson dragon flowers, nearly 3 inches in length, grouped like lustres, producing a very gorgeous effect; the leaves of the plant are elegantly formed, like those of the mountain-ash, and are of a rich green. A purple flowering bean, the seeds of which are the size of the English horse-bean, is here found in abundance, and is eaten by the natives. Melons similar to those formerly seen by me on the Gascoyne, several varieties of brachychiton, a small variety of the *Adansonia*, three or four different kinds of convolvulus (one of which runs along the sands near the beach with arms sometimes as much as 40 yards in length), acacias, *sterculia*, and a variety of *eucalyptus* resembling a stunted red-gum, are also found growing among the hills in small quantities.

16th.—Early this morning the *Dolphin* was moved to within 3 miles of the cove visited yesterday, and anchored in $2\frac{1}{2}$ fathoms at the lowest water, the landing-place bearing west by north. By 11 A.M. the first pair of horses were hoisted out and placed in the water under the counter of the cutter; two other boats assisted in towing us to the shore, which occupied about an hour; the horses, on landing, being scarcely able to stand, from the length of time they were in the water. On reaching the beach a serious accident occurred to Mr. Hearson, the second mate of the vessel, resulting from the negligence of James, the farrier, who, notwithstanding my repeated cautions to all the members of the Expedition to keep snappers on the locks of the guns, had omitted to do so, in consequence of which, on his gun being handed out, the hammer caught on the gunwale of the boat and discharged a ball through both the

hips of the mate, causing him to fall in the water, which circumstance fortunately tended materially to stop the hemorrhage: he was immediately carried to a sheltered spot, and a tent pitched over him. On examining the wound I found the ball had entered the right posterior, passing close below the joint, and, taking an oblique direction through the lower edge of the pelvis, made its exit in front of the left thigh, between the femoral artery and the principal tendon, without injuring either. This mishap, and the freshening of the breeze, prevented our landing any more horses to-day, the remainder of it being spent in making a camp and attending to the comfort of our wounded companion, who occasioned me some anxiety, as the treatment must entirely devolve upon myself, who possessed but a very limited amount of experience in matters of this nature.

17th.—Four more horses were safely landed this morning, and we were returning to the vessel for another pair, when a party of fourteen natives made their appearance at the camp. At first they came boldly up, but on a gun being discharged as a signal for my recall, they appeared much alarmed, although they would not go away. Our numbers being small, I determined not to allow them to enter the camp, on account of their propensity to thieving, and the few that could now be spared to guard the stores were insufficient to keep a constant watch on their stealthy movements: I therefore tried at first to make them understand that we had taken possession for the present, and did not want their company; they were, however, very indignant at our endeavours to drive them away, and very plainly ordered us off to the ship. It was very evident that our forbearance was mistaken for weakness, and that mischief was preparing. I accordingly took hold of one of the most refractory and compelled him to march off at double-quick time, when they all retired to some rocky hills overlooking our camp, from which it was necessary to dislodge them. Taking Mr. Brown with me, we climbed the first hill, which made them retreat to the next. Resting ourselves for a few minutes, and taking a view of the surrounding country, we were just on the point of returning to the camp, when we observed three armed natives stealing down a ravine to the horses, evidently with hostile intentions, as they shipped their spears on getting close enough to throw; we did not, however, give them time to accomplish their object, as we ran down the hill in time to confront them, on which they took to the rocks. Seeing that it was now time to convince them we were not to be trifled with, and to put a stop at once to what I saw would otherwise terminate in bloodshed, we both took deliberate aim and fired a couple of bullets so close to the principal offender, that he could hardly escape feeling the effects of the fragments of lead as they split upon the rocks within a few feet of his body. After dark it set in to rain heavily

for an hour, when lights were observed moving in the direction of our horses, but the sentries being on the alert, no further attempt was made to molest us.

18th.—Two more horses were landed this morning, but rain setting in from the north-west, with a strong easterly wind below, a stop was put to landing any more to-day.

19th (*Sunday*).—It had rained both heavily and continuously during the night, but as our tents were good we did not experience much inconvenience from it, and it gave a fair prospect of finding a good supply of water on our contemplated trip into the interior. Mr. Hearson's wound was progressing favourably, and I was in consequence enabled to go off to the ship and procure a few additional comforts. On our return two more horses were brought ashore, reducing the number on board to one-half.

20th.—We succeeded in landing six more horses during the day; the great distance they had to be swam ashore made the process very slow and fatiguing, some of the horses being scarcely able to stand for some time after landing. This morning I made a rough survey of the cove and surrounding hills, and while so employed observed seventeen natives pass across the shoals at low water, carrying nets, but no weapons: they did not appear to fear us, or inclined to come up to the camp, nor did we offer them any encouragement, as in the present exposed state of our camp they would have been very troublesome.

In the evening Mr. Brown and myself rode across the isthmus to Mermaid Strait, and found it to form a very fine and romantic-looking little harbour, surrounded by a bold rocky coast, giving it much more the appearance of an inland lake than an open strait. I have no doubt that it would afford an excellent harbour; there is, however, reason to think it is equally difficult of access from the main, with the cove upon which our camp is, as a wide expanse of marsh land appears to extend all round behind the hills that bound it to the southward.

21st.—The last four horses were landed this morning, as also the instruments and remainder of the stores required for our first journey. The farrier, with two assistants, was kept busily employed all day shoeing horses.

22nd.—The forge was in full employ during the day, and great progress made with the shoeing and preparations for our departure. Accompanied by Mr. Brown, I rode out to-day to reconnoitre and seek for a place through the hills that encompassed our camp: the only practicable outlet we found to be through some very rocky ravines to the south-west, where at about 5 miles we found, what I had for some time suspected to be the case, that the whole of the isthmus upon which we had landed was cut off from the main land by an extensive salt-water marsh, commencing at the bottom of

Nickol Bay and running parallel to the general line of coast, at least as far as Enderby Island. Skirting the northern edge of the marsh for several miles to the westward, we found it gradually getting wider and deeper; we accordingly returned to the narrowest part, and rode into it for about half a mile, the water being very shallow and the bottom sufficiently firm to carry us, although with considerable labour to the horses. Finding it was getting late, we determined to try and return to the camp round by the head of Nickol Bay, and succeeded in climbing over the rocks and boulders that encumber this portion of the coast, until we were within a quarter of a mile of the camp, when the tide came in upon us so quickly that, after having been repeatedly thrown down by the surf, we were compelled to leave the horses jammed up in the rocks just above high-water mark, and proceeded on foot to the camp.

23rd.—At 3 A.M., the tide having fallen sufficiently, Messrs. Brown and Harding were enabled to bring in the horses left imprisoned last night. During the day all the arrangements for our departure were completed, and in the afternoon Mr. Hearson was removed to the *Dolphin*, having been kept on shore since the accident, to be constantly under my own attendance; he was now rapidly recovering, although much reduced. Wrote instructions for the guidance of Captain Dixon and Mr. Walcott during the absence of the expedition, the latter gentleman being left in charge of the stores and to make such observations as the means at his disposal should admit of.

24th.—Landed at daylight, intending to make a start, as it was the Queen's birthday; but owing to some of the horses having rambled we did not succeed in getting them all in and saddled up before 2 P.M., when three or four of the horses that had not been accustomed to carrying packs commenced playing up and scattering their loads in all directions, straining and otherwise injuring several of the packsaddles, which detained us until so late in the day that I deemed it best to return to camp, and, as the forge had not been removed to the ship, to shorten some of the saddle-irons, to render them less liable to injury, which was otherwise a great improvement.

25th.—The re-adjustments having been satisfactorily accomplished, we made a fair start this morning by 9 A.M. and arrived on the edge of the marsh by 11 h. 30 m., where, having first taken a survey of the several channels from the summit of a high granite hill, we entered the waste of mud at a point where it did not appear to be more than 2 miles wide; an hour's struggle carried us fairly through on to *terra firma*, only one horse having to be assisted by the removal of his load. After resting an hour and a half for dinner we resumed our route in a south direction, across an extensive low grassy plain of red clayey loam, passing over a few rocky

ridges at sunset, and at 6 P.M. encamped on a dry creek 20 yards wide, water being found in some clay pans in the adjoining plain. (*Camp 2.*)

26th.—Being Sunday, the camp was only moved a mile farther to a fine pool of water in a river 80 yards wide, with beautiful grassy banks, which I named the Maitland: it comes from the south-east, and may probably have a course of 60 miles, coming through a plain 5 or 6 miles wide, the greater part of which is occasionally inundated by floods from the interior. Cockatoos and other game were plentiful, sixteen of the former being killed by Mr. Brockman at one shot: they were white, with orange-tinted feathers in the crest, similar to those on the Murchison and Gascoyne rivers. It may be as well here to observe that upon first starting a regular routine of duty had been established in the party, the care and loading of five horses being told off to each two of the party, as they could lift on opposite packs simultaneously; and their being all numbered, every one could at once know the loads under his charge. The night was also divided into eight watches, commencing at 8 P.M. and ending at 6 A.M.; the duty of the first watch being to cook the bread for the following day, and the last to have breakfast ready in the morning by the time it was light enough to see. By this arrangement no time was lost, and every one knew what was under his particular charge. (*Camp 3.*)

27th.—Having determined in the first instance to strike to the westward, with a view to cutting any large rivers coming from the interior that might serve to lead us through the rocky hills that hemmed us in in that quarter, we this morning took a s.s.w. by s. course to 11 h. 40 m., when we crossed a dry stream-bed, 60 yards wide, coming out of the granite ranges to the southward, the country becoming more barren as we edged upon the spurs of the rocky hills. At 2 P.M. we halted on the banks of another stream-bed of the same size as the last, when it came on to rain; resuming our march at 4 h. 10 m., steering west to 6, when we encamped on a dry gully, with a little feed near it. Having pitched the tents, it continued to rain until 11 P.M., when a sudden rush of water swept down the valley, filling the watercourse and carrying away our fire; and before we had time to remove the baggage to higher ground, we had a foot of water in the camp. Fortunately nothing was lost or injured, and it only served as a useful lesson for the future. (*Camp 4.*)

28th.—The early part of the day was employed drying the stores, so that we did not make a start until late. Four-and-a-half hours' travelling over stony country, principally covered with triodia, but containing several patches of good grass, brought us to another river, 50 yards wide, in which were a few pools. This stream was followed up to 5 P.M., when we left it, and halted on

an open plain close to some shallow clay-pans containing rain-water; our course for the day having been about south-west 11 miles. (*Camp 5.* Lat. $21^{\circ} 7'$.)

29th.—By an azimuth of the sun's centre taken this morning, the magnetic variation was observed to be about $20'$ west. Steering N. 230° E. mag. soon brought us out of the hills into a plain extending as far as the eye could reach to the north-west, with a few patches of good grass upon it, but mostly covered with triodia, which was now just ripe, yielding fine heads of seed, which the horses are very fond of. At 13 miles struck the channel of a considerable river coming from the south. As this offered us a fair prospect of working inland, and we had already attained nearly to long. 116° , or about the meridian of the mouth of the Alma, the stream was followed up for an hour, its average breadth being over 200 yards. At 4 h. 40 m. encamped at a fine spring on the bank of a deep pool, under a cliff of metamorphic sandstone nearly 300 feet high; a cane, much resembling a Spanish reed, growing in considerable quantities near the water. (*Camp 6.* Lat. $21^{\circ} 18'$, long. $116^{\circ} 4'$.)

30th.—Soon after starting this morning, we came upon a camp of 15 or 20 natives, on the bank of a deep reach of water, hemmed in by steep rocky hills, up which they hastily scrambled on our approach, and on reaching the summit, tried by various gestures to express their disapproval of our visit, but would not hold any parley with us. At 5 miles the river turned abruptly to the north-east through a precipitous rocky defile, which induced us to make an attempt to cut across and strike the river some miles higher up; but after being for some time involved in impracticable ravines, we were again obliged to have recourse to the bed of the river, although incumbered with beds of large stones, over which the horses had great difficulty in travelling; so that by sunset we had not accomplished more than 6 miles in a direct east-by-south line from last night's camp. (*Camp 7.* Lat. $21^{\circ} 19' 29''$.)

31st.—The general course of the river during to-day was very little to the south of east, its banks still maintaining the same rocky and precipitous character, marks of inundation being frequently observed at the height of 30 feet above the present stream, which now was only running gently in a channel not more than 30 yards wide, but when in flood occupying the whole of the valley, which averages a quarter of a mile in width. The larger pools are lined with flags and reeds, and contain numbers of small fish, resembling trout, similar to those found in the Lyons and Gascoyne rivers. A very handsome tree, resembling an ash, grew on the margin, bearing a beautiful white flower, 4 to 5 inches across, having on the inside a delicate tinge of yellow, and yielding a sweet scent like violets. Several natives were met in the course

of the day, but would not come near us; in one instance, however, we came upon one so suddenly, that he had only time to jump into a pool to escape being surrounded by the party. After calling for some time most lustily for his friends, he gradually crept away amongst the canes and disappeared. Only one tributary of any size was observed to join the river in the course of the day's march, and that came in from the southward. At 5 h. 20 m. P.M. halted on the banks of a deep pool, surrounded by fine cajeput-trees and flooded gum, grass being plentiful for our horses. (*Camp 8.*)

June 1st.—There was a decided improvement in the appearance of the valley as we continued to ascend the river: the deep pools were more continuous, and grass more abundant; the high lands on either bank still, however, retained their rugged outlines, and were clothed with little else but triodia. Travelling along the bed of the river was nevertheless difficult and dangerous for the horses, on account of the immense quantity of rounded boulders of water-worn rocks that occupied a large portion of the channel, and frequently jammed the horses into narrow passes, where they could not be extricated without meeting with very severe falls, which very soon crippled more than one of them; their shoes also began to be wrenched off by being caught in the deep clefts of the rocks, very soon expending all the extra sets brought with us. Just before coming to our night's halt a large stream-bed, 40 yards wide, was observed to come in from the southward. (*Camp 9.* Lat. $21^{\circ} 28' 18''$, long. $116^{\circ} 31'$ by account.)

2nd (Sunday).—Having abundance of feed and water, we gladly availed ourselves of it, to make it a day of rest; it also afforded me an opportunity to ascertain the rate of the chronometer, which, as I had reason to expect, had gone very irregularly since landing.

3rd.—Made an early start, and as the valley of the river was not quite so rugged as that we have passed over during the last two or three days, by noon we had accomplished about 8 miles, the course of the river still being very little from the southward of east; we had not, therefore, made much progress towards the Lyons river (our more immediate destination), and to quit the valley was out of the question, as there is no feed or water out of it, within a reasonable distance. Both the valley and surrounding country are destitute of trees, and bold hills of metamorphic sandstone frequently jut out into the valley and terminate in perpendicular cliffs 200 or 300 feet high. Towards the evening the river had been coming from the northward of east. (*Camp 10.* Lat. $21^{\circ} 27' 48''$.)

4th.—During the forenoon the river became much hemmed in by steep rocky hills, the bed being a succession of rapids, over a

bare rocky channel; but after the noon-halt the stream came more from the south-east, with wide grassy flats on either side, in many parts very boggy, and producing *Melaleuca leucodendron*, with tall straight stems, and a variety of eucalyptus, resembling *E. piperita*. White sandstone and shales began to make their appearance on the banks, and the water in the river had a saline taste. Several of the horses began to show signs of being much distressed, by falling and sticking fast in the mud, from which they had not strength to extricate themselves, even after being relieved of their loads. Ducks were plentiful and tolerably tame. (*Camp 11*. Lat. $21^{\circ} 33' 55''$, long. $117^{\circ} 2'$ by account.)

5th.—Having marked a large double-stemmed gum-tree with N A E and the date, we made a start up the river, but at about a mile found the valley narrow in until the channel of the river, which was here full of water, was walled in on both banks by perpendicular cliffs, from which we were compelled to turn back nearly to our last night's camp. During the last two days we had caught an occasional glimpse of an elevated range of hills extending for many miles parallel to the river and about 10 miles to the southward, which rendered it probable that some change would now be found in the character of the back country, enabling us to travel without being so frequently retarded by the rocks and bends of the river. A suitable spot was accordingly selected for ascending out of the valley, which was accomplished with some difficulty, when the country was observed to be intersected for many miles by deep ravines, terminating, however, to the south in a level plain, extending to the base of the range already referred to. After four hours' heavy toiling, we at length reached the summit of the plain, water having been found in one of the rocky gullies by the way. For the first half mile, on entering the plain or table-land, the ground was stony and covered with stunted acacia, but it very quickly changed into a rich clayey loam, yielding a splendid crop of kangaroo and other grasses, melons, and small white convolvulus, yielding a round black seed the size of a pea, which we found scattered over nearly the whole surface of the plain for miles together. In the lower parts of the flat rain-water appeared to have remained in shallow clay-pans until very recently, killing much of the grass, which was replaced by *atriplex* bushes. As we approached the foot of the range, the ground became stony and covered with *triodia*; good grass was still, however, to be found in the ravines leading out of the hills, and as our object was now to shape a course to the southward, we followed up one of the most promising valleys, in the hope that it might lead us through the range; but we were disappointed in finding that, after pushing some distance up very steep and rocky passes, they all terminated in cliffs of horizontal sandstone,

running in parallel bands, one above another, to the height of 500 or 600 feet, and frequently extending, without a break, for 10 or 15 miles along the face of the range. The horses being much fatigued by the climb from the valley of the river, we encamped at 3 h. 10 m. within the hills, and without water. (*Camp 12.*)

6th.—A light drizzling rain came on early in the morning, but not enough to supply the horses, which rambled so far during the night in search of it, that it was noon before they were all collected. Quitting the range, which had been named, after one of the most liberal promoters of the Expedition, Hamersley Range, we took a north-east course, crossing over 12 or 14 miles of beautiful open grassy plain, in many parts the kangaroo grass reaching above the horses' backs; the soil being of the richest clay-loam, occasionally containing beds of singular fragments of opaline rocks, resembling ancient lava. By 5 h. 30 m. P.M. we reached the river again, several miles above the deep glen that had checked our course on the 5th. The valley having again opened out, gave us easy access to its banks, which were here a rich black peat soil, containing numerous springs. Here was first observed a very handsome fan-palm, growing in topes, some of them attaining to the height of 40 feet and 20 inches diameter, the leaves measuring 8 to 10 feet in length. The river had again opened into deep reaches of water, and contained abundance of fish resembling cobblers, weighing 4 and 5 lbs. each. The whole character of the country was evidently changing for the better, and as I have no doubt that at no distant period it will become a rich and thriving settlement, I named the river the Fortescue, after the Under Secretary of State for the Colonies, under whose auspices the Expedition took its origin, and the large expanse of fertile plain that lies between the river and the Hamersley Range, Chichester Downs.

7th.—A quarter of a mile up the river brought us to a fine tributary from the south, running strong enough to supply a large mill. This had to be traced up for 2 miles before we could find a ford; it was found to take its rise in several deep pools, fed by springs issuing out of the plains crossed yesterday. Some powerful springs were also observed to flow into the river from the northward, through a dense forest of melaleuca, with a rank undergrowth of canes, flags, &c. At 5 miles the river again presented a wide reach of water several miles in length, after which it all at once broke up into numerous channels, wandering through a forest of white gum, well grassed, the soil being highly fertile. Owing to my having been accidentally trodden upon by one of the horses, we were obliged to encamp early, having only made about 12 miles. (*Camp 14.* Lat. $21^{\circ} 40' 42''$; long., by account, $117^{\circ} 17' E.$)

8th.—Following up the channel upon which we had encamped,

in about an hour it was lost in open grassy plains, which we continued to traverse until noon, when we struck on a well-defined stream-bed, which had branched off a mile or two short of last night's camp. Grass and water being abundant, we halted till 2, when we resumed an easterly route to 5 h. 30 m., over rather stony plains, yielding triodia. Encamped after dark without water or feed, tying the horses up short to prevent their rambling; having accomplished about 20 miles in an E.S.E. direction during the day. (*Camp 15. Lat. $21^{\circ} 49' 40''$.*)

9th (Sunday).—Less than a mile this morning brought us to a grassy channel containing water, which was followed up for a short distance, when we halted for the remainder of the day to refresh our tired and famished horses. (*Camp 16.*)

10th.—The channel of the river was still followed for several miles to the eastward, when it again disappeared in open plains extending to the base of the Hamersley Range, which still continued to run parallel to the river, at about 7 miles' distance to the southward. Pools of water were occasionally found in channels scooped out of the alluvial soil of which the plains were composed, the waters of the Fortescue, during the period of the summer rains, spreading over the country for miles, and leaving a rich deposit of alluvial mud, adding greatly to its fertility. In the course of the afternoon we came suddenly upon a party of natives, digging roots. One woman, with a child about five years of age, hid close to our line of march, and did not move until she was afraid of being run over by the pack-horses, when she ran away, leaving the child gazing upon the monster intruders with a look of passive wonder. It was a poor, ill-conditioned-looking object, suffering from a cutaneous disorder. On giving it a piece of damper, it quickly began to devour it, tearing it to fragments with its sharp and attenuated fingers, with all the keenness of a hawk. We left it standing with a lump of bread in each hand, where its mother would no doubt find it when she came to see what had been left of it by the *large dogs*, as the aborigines of this part of Australia call our horses. Travelling on till late, we encamped in an open grassy plain, without water. (*Camp 17. Lat. $21^{\circ} 55' 57''$, long. $118^{\circ} 3'$.*)

11th.—Four miles to the south-east we came upon a pool of brackish water, surrounded with bulrushes, in a channel coming from the south of the Hamersley Range, again apparently offering us a chance of getting to the southward. We accordingly struck for the gorge out of which this stream came, and succeeded in penetrating for three miles up a very rocky gully, filled with some of the harshest triodia we had yet encountered, and had to halt for the night in a narrow pass, where there was scarcely room to tie up our horses. (*Camp 18. Lat. $22^{\circ} 12' 52''$.*)

12th.—One of the horses having slipped his halter during the night, Messrs. Brown and Brockman returned down the gully to track it up, while we made an attempt to follow up the deep defile in which we were hemmed, but a quarter of a mile brought us to an impassable barrier of cliffs. Retracing our steps about a mile, we again made an attempt more to the eastward, and this time succeeded in reaching a considerable stream-bed, which ultimately proved to be the main channel of the Fortescue, and led us through the range. Resting till noon, Messrs. Brown and Brockman overtook us with the missing horse, when we resumed our route up the bed of the river to the southward, until again brought to a dead stand by the whole bed of the stream being occupied by deep pools of water, fed by numerous strong springs. As it was getting late in the day, I left the party to form a camp, while I climbed the hills to get a view of the country in advance. A laborious ascent of nearly an hour brought me to one of the highest summits of the range, at an elevation of about 2,700 feet above the sea, and 700 above the bed of the river. From this hill I had a fine view to the southward, and observed that by following up a small dry ravine to the south-east, there would be a fair prospect of reaching a large extent of open level plain, that came within 2 or 3 miles of the camp, in that direction. To the east and south-east the range was lofty and mountainous, while to the south and south-west stretched open grassy plains, occasionally interrupted by bold detached hills, apparently of the same formation as the Hamersley Range. On descending to the camp, I started a fragment of rock of a few tons' weight, which rushed with fearful velocity towards the deep gorge in which the horses were feeding. After carrying all before it for a quarter of a mile, it made a clear spring over a cliff 200 feet in depth, and plunged into the waters below with a sound like thunder, inducing a belief at the camp that a large portion of cliff had fallen. Fortunately it did not produce an *estampede*, which I had known to have been caused on another occasion by a similar occurrence. (Camp 19. Lat. $22^{\circ} 15'$, long. $118^{\circ} 4' 30''$.)

13th.—Availing ourselves of the observations made yesterday, we succeeded, after a hard scramble of two hours, in getting through the remaining portion of the range, our horses having learned to climb like goats, or they never would have accomplished the passage. The plain appears to have a considerable elevation above those to the northward, and is drained by several deep breaks through the Hamersley Range. Resuming a s.s.w. course to lat. $22^{\circ} 26' 32''$, we passed at first over some very stony land, yielding little else besides triodia and stunted acacia, but for the last 6 or 7 miles was a rich alluvial clay, covered with very fair pasture, and water was found in abundance in pools in the bed

of a watercourse coming from the south-east. (*Camp 20. Lat. 22° 26' 58".*)

14th.—On our first landing at Nickol Bay, the nights had been very mild, but we now began to feel them cold and bracing. This was partly owing to the increased elevation of the country we were now travelling over; the south-east wind, coming off the mountainous country, was very keen, and almost frosty early in the morning. Our course this day was at first over tolerably good country, which gradually became more and more rocky, the ridges increasing in elevation, until the aneroid barometer fell to 27·33, giving an altitude of 2,400 feet above the sea. Night overtook us in a deep rocky ravine, where we had much difficulty in keeping the pack-horses together, and were at last compelled to unload them amongst rocks in the bed of a dry watercourse trending to the westward; a little grass being procurable in the vicinity. Fortunately water had been met with at noon; so that we were not pressed for want of it. (*Camp 21. Lat. 22° 41' 43".*)

15th.—Following the gully upon which we had encamped, it led us to the westward, over a very rocky line of country, until 1 P.M., when, not meeting with any water, and the horses showing great weakness and symptoms of distress from the loss of their shoes, it was found desirable to quit the main gully and try and find feed and water up a promising tributary coming from the north, with the view of ultimately falling back on the plains under the Hamersley Range, should we fail to meet with water sooner; fortunately, however, in an hour we came upon a small supply amongst rocks, surrounded by some tolerable feed. Had we failed to find this timely relief, it is probable that not more than half the horses would have been able to carry their loads back to the nearest known water-hole. (*Camp 22.*)

16th (*Sunday*).—This day of rest was alike acceptable to man and horse, and afforded me an opportunity, after reading prayers to the party, to clear a set of lunar distances, by which I found that the chronometer would have placed us 40 miles to the west of our true position. I had long since observed that it could not be trusted under even ordinary variations of temperature, but could procure no other, the Acting Surveyor-General having declined to supply me with either of the two chronometers belonging to his department that could be relied on, and in consequence I now found I should be compelled to have recourse entirely to lunar observations and triangulation for the compilation of the maps, which would add very much to the amount of labour and liability to error. Several crested pigeons, white cockatoos, and crested quail or partridges, were shot as they came to drink at the water-hole.

17th.—The horses had so far recovered after the day's rest,

that we were enabled to resume a south-west course, following down the bed of the stream to lat. $22^{\circ} 51'$, the country slightly improving towards evening; but we again had to encamp without water, having however obtained a small quantity in some gravel at noon. The hills to the east of our track rose about 1000 feet above the bed of the watercourse, and consisted of metamorphic sandstones and shales, intersected by whinstone dykes, their summits being capped with red conglomerate. In one place the river had cut through a ridge of altered rocks, and exhibited a very singular contortion of the strata, the laminae being crippled up into an arch of 100 feet high, showing a dip on each flank of 45° , forming a cave beneath, running for some distance into the hill. (*Camp 23.*)

18th.—Continuing to follow the stream-bed south-west for 8 or 9 miles, we came upon a patch of very green grass, on which we halted, to allow the horses the benefit, on account of their not having had any water since noon yesterday. In the meanwhile, accompanied by Mr. Brown, I started off and walked to a prominent hill 6 miles to the south, to get a view of the surrounding country. From the summit of this hill, which we found to have an elevation of 700 or 800 feet, we procured a valuable round of bearings, and had a distant view of the country to the southward. Level plains and detached ranges of moderate elevation appeared to be the general character of the country towards the Lyons River. We returned to the party by 3 P.M., and were glad to find that during our absence water had been found in shallow clay-pans a mile to the westward, to which we moved over and encamped. (*Camp 24.* Lat. $22^{\circ} 56' 23''$, long. by account $117^{\circ} 21'$.)

19th.—We were unable to proceed this day, owing to my having eaten some of the dwarf mesembryanthemum, which I had formerly observed to be used as food by the natives on the Gascoyne, but which had produced with me violent headache and vomiting. The horses were, however, enjoying excellent feed; and I contrived to work up my map and clear a lunar.

20th.—Started at 7 h. 25 m., with 19 horses, having been obliged to leave behind a horse belonging to Mr. Lennard, so lame that he could not move. Following the stream-bed nearly west for 10 miles, came upon a pool of permanent water, containing flags—the first we had met with since quitting the Hamersley Range. This was of great value, as there was no water that could be depended upon on our return, in the last 60 miles. Pushing on quickly for 12 miles farther, the river entered a wide plain, in which was some tolerable feed; we had again, however, to halt for the night without water.

21st.—Although the size of the channel of the river we had

been following down for the last 60 miles had considerably increased both in width and depth, yet very little water had been found in it, and as it took a decided turn in its course this morning to north-west, after two hours' ride, without observing any change, and there being every appearance of its keeping the same course for the next 20 miles, I was convinced that it could not be a tributary to either the Edmund or Lyons, which I had at first hoped it might prove. The barometer also ranged too high for it to be at a sufficient elevation to admit of its flowing into either of those rivers, as the elevation of the Lyons at the confluence of the Alma is at least of the same altitude above the sea. Having named the river the Hardey, we fell back upon the pools passed yesterday, where I had decided upon forming a *dépôt* camp, at which to rest the weakest horses, while with a lightly-equipped party I proposed to complete the exploration of the country intervening between this and the Lyons River. (*Camp 26.* Lat. $22^{\circ} 58' 28''$, long. $117^{\circ} 10'$.)

22nd.—In accordance with the plan decided upon yesterday, I started this day, accompanied by Messrs. Brown, Harding, and Brockman, with 3 pack-horses, conveying 8 days' provisions and 14 gallons of water. Twelve miles on a s.s.w. course over a very stony country brought us to a deep stream-bed trending in the same direction, which we pursued for 13 miles, the country gradually improving, until the channel was lost in an open plain of rich soil, covered with fine green grass. Several pools of rain-water of a deep red colour, but fresh and sweet, gave us a good camp for the night; a set of stellar observations giving the lat. $23^{\circ} 19' 16''$. To the south, at about 6 miles' distance, lay a bold range of hills, running nearly east and west, with many sharp summits, having an average elevation of from 600 to 1000 feet above the plain, and extending for 12 or 15 miles to the eastward, while to the west it was lost in numerous broken hills of lesser elevation. (*Camp 27.*)

23rd.—As to pass the eastern end of the range appeared likely to take us too much off our course, we struck for what appeared to be a break in the hills about 7 miles to the south-west. The first 5 miles was across an open grassy plain, at times subject to inundation, which brought us to the bank of a fine river, containing permanent reaches of fresh water, lined with canes, the channel generally being from 100 to 200 yards wide, with a depth of 40 feet; it was now barely running, but it was quite evident that it was too large for either the Alma or Edmund, and its bed must be at least 200 feet below the level of those rivers. We, however, determined to follow it so long as it ran to the south of west, which it did until it came in contact with the range observed yesterday, when it altered its course to w.n.w., and appeared to continue that

direction for many miles, probably until joined by the Hardey, when, in all likelihood, it continues its course direct to Exmouth Gulf. Anxious as I naturally was to continue the examination of this promising river, time and the condition of our horses' feet did not permit us to do so with advantage. Naming it the Ashburton, after the noble President of the Royal Geographical Society, we quitted its verdant banks, and took a south course up a stony ravine, which led us into the heart of the range, where we soon became involved amongst steep rocky ridges of sharp slaty schist, which very quickly deprived the horses of many of their remaining shoes, and retarded our progress so much that by night-fall we found ourselves to be in only lat. $23^{\circ} 28' 15''$ —hemmed in on all sides by rugged country, yielding little else but small acacia-trees and triodia. A little water and grass was, however, obtained in the bed of a stream tributary to the Ashburton. The summits of the hills passed over during the day had been seen from the Lyons River in 1858, and were now named the "Capricorn Range." (*Camp 28.*)

24th.—A rather rough ridge of four hours to the south-east brought us to a watercourse 60 yards wide, trending to the N.N.E., in which we found pools of water, lined with reeds and flags. This was traced up to the southward till 3 P.M., when we entered a deep gorge in a sandstone range, the bed of the stream becoming very stony and full of melaleuca-trees; it, however, contained many fine pools and strong running springs, with a small supply of grass. There was now a fair prospect of our reaching the Lyons, as the range we were entering must contain the sources of the Edmund, which river has a much more restricted course than was originally supposed. (*Camp 29. Lat. $23^{\circ} 42' 15''$.*)

25th.—The country continued hilly for about 10 miles, when we arrived at the summit of a granite and sandstone table-land, at the extreme sources of the watercourse we had been following up. From this point we had at last the satisfaction of observing the bold outlines of Mount Augustus, bearing S.S.E. about 30 miles, while more to the westward could be discerned the summits of Mounts Phillips and Samuel, and yet more to the right the southern face of the Barlee Range. Descending to the south across an open plain, we struck for a remarkable gorge in a granite range (the only one now between us and the Lyons), at which we arrived by sundown. On examining this singular gorge, it was found to be an almost perpendicular cut through a narrow ridge nearly 200 feet in depth, the length of the pass not exceeding 200 yards, the plain on each side being nearly on the same level. From the summit of this pass the course of the stream could be traced across the fertile flats of the Lyons until it was lost in the numerous channels of that river, and I was able to obtain bearings

to many well remembered objects noticed on my former visit to this part of the country. (*Camp 30.* Lat. $23^{\circ} 56' 45''$.)

26th.—As we had only four days' rations left, and no object could be attained by advancing farther south, unless there had been time to examine the present condition of the pasture in the vicinity of Mount Augustus, we marked several trees on the north side of the gorge close to a pool, and retraced our steps to within a mile of our camp of the 24th, having improved upon our outward track by keeping rather more to the eastward. (*Camp 31.*)

27th.—Instead of returning by the rough route by which we came through the Capricorn Range, we followed the stream to the N.N.E., through a good country all the way to the Ashburton, which river it joined in lat. $22^{\circ} 26'$, passing through the end of the range 1 mile south of the junction. In this pass we encamped on a fine deep pool, in which we caught a small quantity of fish, showing the water to be permanent. (*Camp 32.*)

28th.—Making an early start, we soon crossed the Ashburton, and rode for 12 miles across open plains, thinly timbered and yielding a large quantity of good pasture, principally of kangaroo grass, which here grew to the height of 6 feet. Resting for several hours at the water-holes of the 22nd, at 4 h. 30 m. P.M. we resumed our route, having filled our water-kegs, and pushed on to within 16 or 17 miles of the dépôt, encamping amongst some good grass on our outward route, but without any water except what we carried with us. (*Camp 33.*)

29th.—Giving our horses rather more than a gallon of water each, we made an early start just as it came on to rain, which was the first shower we had experienced since the 27th May; it continued until noon, but not heavy enough to leave any surface water on the parched and thirsty loam. Keeping more to the westward than our outward track, we escaped much of the stony ground then passed over, and arrived at the dépôt camp by 2 P.M.

30th (*Sunday.*)—Remained in camp and read prayers to the party.

July 1st.—The horses left at the dépôt were much improved by their 9 days' rest, and had we been provided with more shoes for them, I should have at once returned to the Ashburton, and traced that river up to the eastward, as it offered a fine opportunity of penetrating to the south-east, probably at least another 100 miles; and our provisions on a reduced allowance would admit of our remaining out 40 days longer; but the lameness of many of the horses, and the lacerated condition of their fetlocks, convinced me that should we meet with any more difficulties or rough country before obtaining a fresh supply of shoes, much valuable time would be lost, and we should probably fail to get many of the horses back. I therefore deemed it more prudent to return at once by a

shorter route more to the eastward, so soon as we had repassed the Hamersley Range, and, obtaining a refit at the bay, to throw all our remaining time into the second trip. We accordingly to-day returned to Camp 24, where we found the horse left there on the 20th June, sufficiently recovered to accompany the party, although incapable of carrying a load. The remainder of the day was devoted to obtaining bearings, and adding to the triangulation of the many remarkable summits visible from this part of the country.

2nd.—The country generally being very rough, except on the banks of the Hardey, on our outward track, we found it desirable to return along it, more particularly as there was a better prospect of procuring water by so doing. At about 20 miles we found a little water under a cliff in the bed of the stream, and halted for the night. (*Camp 34.*)

3rd.—Still returning on our old track, at 5 miles I stopped to ascend a very remarkable hill which had formed an important point in the triangulation of this part of the country, to which had been given the name of Mount Samson. Sending the party onward to wait for me at Camp 22, I commenced the ascent of the mount, which proved something more than I had calculated upon, as it occupied more than an hour's sharp toil to arrive at its summit; when gained, however, it amply repaid the trouble, as from it I could discern almost every prominent hill or peak within 60 or 70 miles, and amongst them the mountain which, on a former occasion, I had procured a bearing to from Mount Augustus, at a distance of 124 geographical miles, and which I now named Mount Bruce, after the gallant commandant of the troops, who has always warmly supported me in carrying out explorations. This part of the country I believe to be the most elevated in North-West Australia: Mount Samson having an altitude of not less than 1000 feet above the valley of the Hardey, while Mount Bruce and the mountainous country to the eastward rose to a considerable height above its summit, which, by comparisons from the aneroid barometer, would give not less than 4000 feet for the elevation of those ranges. Having completed my observations, I descended the hill with somewhat greater speed than it took to climb it, and was met at the foot by Messrs. Brown and Harding, who had waited for me with a horse. In less than an hour we overtook the rest of the party at Camp 22, when the additional horses at once drank up all the remaining water left in the rocks; resting, therefore, less than an hour, we moved on, taking a north course, over a very rocky but highly fertile country of trap formation, the grass just now being much dried up. At sundown we halted in an open grassy flat, on which no water could be found, although it is probable there is plenty in the vicinity, as emu and cockatoos were

numerous; one of the former walked boldly up to the horses, and was fired at, but without effect. (*Camp 35*, lat. $22^{\circ} 32' 13''$.)

4th.—Travelling at a rapid pace on an average north-east course for upwards of 20 miles, over plains mostly of rich loams, well grassed, and extending to the southern foot of the Hamersley Range, we came upon a low range of sandstone hills, covered with acacia bushes and triodia, extending for 3 or 4 miles, when we again emerged on open plains, in which was found a deep channel, 30 yards wide, containing pools of rain-water retained in the clay. The amount of fine pasture-country passed over during the day could not be less than 200,000 acres; and although we had not time to go in search for it, I have no doubt that abundance of water will be found in the deep gorges of the range skirting the plain. This tract of country is, I imagine, well suited for the growth of either cotton or sugar, as it is apparently well irrigated during the summer months, and the soil is remarkably rich and strong, while its limits to the westward are at present unknown, and it most probably continues to skirt the hills for at least 30 or 40 miles. Halted at the water-holes about 4 miles to the west of the pass through the Hamersley Range. (*Camp 36*.)

5th.—Two hours brought us to the head of the pass, which we entered by a ravine a little more to the northward than on our outward route, and by so doing saved a preliminary ascent of nearly 200 feet, and a similar amount of descent, making a very successful passage through the range, without experiencing the same difficulties we had formerly met with, and by 3 P.M. found ourselves once more in the open grassy country that forms the Chichester Downs. At 6 P.M. encamped in an open flat without water. (*Camp 37*.)

6th.—Started at 7 h. 30 m., and in an hour came upon a pool of water in one of the numerous channels into which the Fortescue is here divided, and at 7 miles struck the bulrush spring passed on the 11th June. From this the river was followed down for 13 miles through grassy clay plains, thinly timbered with white-gum. Encamped on a pool, in lat. $21^{\circ} 53' 4''$, about 5 miles north of a very remarkable bold projection of the Hamersley Range. (*Camp 38*.)

7th.—Sunday was kept as a day of rest.

8th.—The horses strayed so far back on our tracks during Sunday night, that by the time they were brought in it was too late to make a start with advantage, as we were now about to enter a new tract of country, by striking for the coast somewhere between Breaker Inlet and Depuch Island. As a knowledge of this part of the country would greatly assist us in starting on the second division of our exploration, I availed myself of the delay

here to fix by triangulation many of the summits and prominent spurs of the Hamersley Range, and take observations for the variation of the needle, which I found to be about 1° E. by the prismatic compass I had in use.

9th.—Our horses again gave us some trouble to find them, so that we did not start until 10 h. 30 m. Two hours' sharp travelling across the plain brought us to the foot of low hills of trap and sandstone, covered with triodia; good feed being, however, plentiful in the valleys, although now rather dry. Tracing up a small tributary to the Fortescue, at sunset we halted on a small rocky pool, near its source, in lat. $21^{\circ} 41' 40''$. Several pools, supplied by springs coming from under the superstratum of sandstone, were passed during the day. (*Camp 39*, long. $117^{\circ} 47'$.)

10th.—For 7 miles the country continued gently to ascend, the sandstone giving place to trap boulders, yielding a very rich soil, clothed with short green grass and melons, the soil being too stony for agricultural purposes, although I have seen country of a similar appearance in the island of Mauritius producing fine crops of sugar. Some of the melons weighed as much as 5 or 6 ounces, and were passably good eating, although rather bitter. At noon the country dropped suddenly to the northward, and we descended a deep rocky ravine in which we soon found water and grass. Travelling now became difficult and sometimes dangerous to the horses; rugged and semi-columnar metamorphic sandstone cliffs hemmed in the ravines on either side, while large rounded boulders of trap rock filled the bed of the stream, which in several places was running. We had a rather indifferent camp in lat. $21^{\circ} 29' 10''$, the camp at Nickol Bay bearing W.N.W., distant 75 miles by account. (*Camp 40*.)

11th.—The stream we were upon continued to take a northerly course for 8 or 10 miles down a valley from 200 to 300 feet in depth, where it is diverted to the eastward for about the same distance by a cross range of black volcanic hills of loose ragged rocks, totally devoid of vegetation. The channel, receiving several tributaries, here becomes a succession of fine open pools of water from 80 to 150 yards in width. We halted for the night on a wide bed of bare sand and rocks, the only feed being in the channel of the river, to which was now given the name of Sherlock. (*Camp 41*.)

12th.—This morning the river resumed a N.N.W. course, and very soon led us out into an open plain, rather sandy in character; the channel dividing into several branches, separating, miles apart, the stream of water issuing from the hills, soon being absorbed in the sandy bed; but a well-defined line of verdant trees served well to mark the course of the channels through the plain for many miles. Selecting the one that appeared the most promising, it was

traced down to lat. $21^{\circ} 6' 43''$, where we encamped on a shallow pool of brackish water, the only one seen during the day. Several natives were found here, employed capturing partridges, by means of nets constructed out of the leaf of the triodia, neatly twisted and netted in the same way as done by ourselves; the mesh varying from 1 to 5 inches according to the purpose to which it is applied. It was very singular to observe the mode in which they induce the birds to enter the nets or rather cages prepared for them. In the first instance they place ragged bushes all round the small pools, with the exception of a few spaces 5 or 6 feet wide, from which openings they stick in a double row of twigs, arching so as to meet overhead in the centre 1 or 2 feet from the ground; these little avenues lead away for several yards, and then terminate with a net thrown over a few light sticks at the end. The birds first alight on the margin of the pool, but after drinking do not take flight at once, but run up the only opening, which leads them first under the arch of twigs and finally into the net, which is then drawn to by the hunter lying in wait under a few bushes. In this way they must capture a large amount of game, judging by the quantity of feathers around some of the water-holes. (*Camp 42.*)

13th.—Two miles north the river turned west, and kept that course for 7 or 8 miles, through a poor sandy and stony tract of country, and was then joined by a fine channel coming from the south. Near the junction are two reaches of water, half a mile long each and a rifle-shot across, containing a quantity of ducks and other water-fowl, amongst which our sportsmen were very successful, along with other game, bagging the only two swans we had seen since landing; a number of fine fish like cobblers were also caught, weighing from 1 to 5 lbs. a-piece. As it was Saturday, and our horses were showing unmistakeable signs of knocking up, we halted for the rest of the day. (*Camp 43.* Lat. $21^{\circ} 6' 5''$; long. $117^{\circ} 32' 30''$.)

14th (*Sunday*).—After reading prayers, Messrs. Brown, Harding, and myself walked to the summit of the range of black volcanic hills that skirted the western bank of the river, at about a mile distant. These hills consist of ragged scoria, elevated 300 to 400 feet above the plain, and are nearly destitute of vegetation. At their summits are deep fissures, the heat of the eruptive rocks from beneath having been sufficient to convert the trap and sandstone rocks into a deep bluish grey scoria, having a specific gravity of nearly 4, but we did not observe any instance of the actual overflow of lava, and consequently there was a want of the fertilizing properties in the soil resulting from it that usually accompanies volcanic formations. A native dog had left a litter of pups under a heap of stones not 18 inches beneath our feet, but such was the sharpness and ponderability of the fragments of rock, that it fairly

baffled our attempts to unhouse them. A valuable round of bearings was procured from this spot, Depuch Island being seen, bearing N. 14° E., distant about 28 miles.

15th.—We resumed our course down the Sherlock, the stony nature of the country telling severely upon our horses' feet, which in other respects were in very tolerable condition. We had not proceeded more than 3 or 4 miles, when Mr. Brockman's horse, Rocket, gave in and could not move another step, the hoof being fairly worn through; leaving him close to a pool of water amongst plenty of feed, I hoped he might possibly recover by the time we returned from the bay. Below this the channel became sandy and dry, and we only procured a little water at night in a clay-hole. Plains extended from the river to the north and eastward as far as the eye could reach, only interrupted by occasional detached hills of granite or volcanic trap, the feed being generally coarse and the soil poor. (*Camp 44. Lat. $20^{\circ} 54' 45''$.*)

16th.—Leaving the valley of the river on a north-west course, in half an hour we came upon an open plain of rich clayey loam, covered with a fine even sward of good grass, on which were feeding large flocks of pigeons and white cockatoos; this change in the character of the soil being ascribable to the occasional overflow of the river, leaving a deposit of rich mud. This plain extends as far as we could see to the north and east, a few widely-scattered tops of trees being the only objects breaking the monotony of the sea of grass. To the north-west was a strong line of large timber, for which we steered. At 3 miles we entered the wood, and found it to contain the main channel of the Sherlock, in which were a few small pools of rain-water. Crossing the bed of the river on the same course, we soon came upon another branch coming from the south-west, which was named the George. Immediately below the junction of the two streams, the river opened out into reaches of brackish water, evidently under the influence of the spring tides. From this point the left bank was followed down to within 3 or 4 miles of the sea, where the country becoming low and flat, the grass coarse, and no fresh water procurable, we quitted the Sherlock and struck to the west for 6 or 7 miles, crossing several salt-water creeks, until we were compelled to turn to the southward, to avoid a channel much larger and deeper than the rest, at which a party of natives were engaged drawing their nets, but ran away on our approach. A little farther on the plain became more fertile, and we found a small pool of rain-water in the clay, at which we encamped. There is no doubt that the Sherlock and the creek we were upon discharged their waters by the numerous creeks shown on Captain King's charts, 15 or 16 miles to the west of Depuch Island. (*Camp 45. Lat. $20^{\circ} 52' 15''$; long. $117^{\circ} 15'$.*)

17th.—By observation of the sun at rising, the variation of the needle was found to be $1^{\circ} 10'$ E. We were now about 40 miles from Nickol Bay, and as it was very doubtful whether water would be procurable in that distance, I became very anxious on account of the horses, as, should the country prove stony, I was quite certain they could not perform the journey in less than three days; I therefore determined upon following up a leading valley towards the Maitland River, with the intention, in the event of not finding water or a pass through the heavy mass of hills that back Cape Lambert, of pushing through the upper branches of that river, and by a round of 60 or 70 miles to approach the bay by our outward track; fortunately, however, in the course of the day we fell in with some small pools of rain-water, which enabled us to advance about 18 miles over tolerably even plains, well grassed, our night-halt being without water. (*Camp 46.*)

18th.—From our position, and the observations I had made of the country on the eastern shores of Nickol Bay, I was satisfied that the breadth of stony ranges lying between us and our destination did not exceed 8 or 10 miles, which we therefore now determined to venture upon, although at great risk to the horses, some of which now walked upon stones as they would over red-hot coals. Entering the range by a small ravine, 3 hours' scramble over sharp rocks brought us out on the head of a small tributary to the Nickol River, the sufferings of the horses in crossing the range being quite painful to witness; they all, however, succeeded in getting through, and as a little water was found in the bed of the stream, we were enabled to push on late, and cross the marsh at the head of the bay before it was quite dark, the departing rays of the setting sun having first favoured us with a glimpse of the *Dolphin* riding at anchor on the deep blue waters of the bay—a sight which was welcomed with no small satisfaction by the little band of weary travellers. (*Camp 47.*)

19th.—The camp was easily aroused by the morning watch, as there was now only 6 miles between us and the landing-place in Hearson Cove, the horses appearing to partake of the general activity; so that it was only 10 A.M. when we arrived on our old camping-ground, which we found occupied by ten or a dozen natives, engaged mending their nets. Coming upon them suddenly, they would not stop to carry off their gear, although not half an hour before they had been employed assisting a boat's crew from the *Dolphin*, in loading with wood and water. A rifle-shot soon recalled the boat, which was not a mile from the shore, when we were glad to learn that Mr. Hearson was fast recovering from his wound, and that all had been going on well since our departure. From Mr. Walcott I ascertained that he had been able to establish a friendly understanding with the natives who frequented the

western side of the bay, and that they had been made useful in filling up the ship's water and wood, for which service they had been rewarded by a suitable distribution of biscuit. In one instance the natives on the eastern shore of the bay had shown a hostile tendency, on the occasion of a boat landing on the reef to gather shells. One of the seamen, who had wandered from the rest, was chased into the sea, and menaced with spears and clubs, until he was up to his neck in water, when the boat came to his rescue, the officer in charge of her firing a shot over their heads to drive them off. Mr. Walcott had also been successful in obtaining a very useful vocabulary of native words and other interesting particulars from the aborigines, as also many botanical specimens, shells, &c.,—amongst the latter, some very fine pearl oysters, from which several pearls of good colour had been obtained, but appeared to be principally valuable on account of the size and beauty of the mother-of-pearl, which averaged 6 inches diameter, with more than half an inch in thickness of solid shell.

20th.—The forge, stores, and other additional supplies having been landed, and the party set to work shoeing horses, repairing saddlebags, &c., I proceeded with Mr. Walcott and Mr. Angel in the boat to make a rough survey of the coves on the western side of the bay, with a view to selecting a suitable spot from which to re-embark the horses on our return from the next trip, as it would be too late in the season, by that time, to venture the trip overland to Champion Bay. I found that a good anchorage existed, with 3 fathoms at low water, 1 mile off the little cove from which the ship had been watered, and is approachable at all times, except in strong east or south-east gales, when a heavy swell sets in across the bay, rendering a landing unsafe. The fresh water runs down a rocky gully at the north-west corner of the cove, at the north end of a small patch of sandy beach, and the supply appears tolerably abundant; it is, however, rather difficult of access towards the end of the dry season, as the water has then to be carried over the rocks in small baracas 50 or 60 yards to the boats; but from the setting in of the rains to the end of August, it runs down strongly at high-water mark. I walked back overland to the camp with Mr. Walcott, the distance being about 4 miles; heading by the way another deep cove, the margin of which was lined with a broad belt of mangroves.

21st to 28th was fully taken up in shoeing horses, making spare shoes, refitting and packing stores, &c., ready for our trip to the eastward, my own time being principally taken up in roughly plotting the country already explored, so as to secure all the information obtained, in the event of any accident occurring to my field-books.

29th.—Everything being in readiness for our departure, I gave

Captain Dixon instructions to wait for us in the bay to the 10th December, and in the event of our not then returning, Mr. Walcott would land one of the ship's iron tanks, and bury in it a quantity of stores, at a spot already agreed upon; the *Dolphin* would then proceed to Fremantle. It blew so fresh all the morning, that I could not land until 3 P.M., when we quickly saddled up and proceeded 3 miles to a water-hole up in the volcanic hills, as it was probable we should have a very long day's march to-morrow without water. As we had now only 19 horses, and one of these so low in condition as not to be able to carry a load, we could only take with us 87 days' rations, at the rate of 1 lb. of flour, 7 oz. of meat, and 4 oz. of sugar per man per diem; we were, however, well provided with ammunition, and 30 spare sets of horse-shoes, with nails sufficient for at least two removes, the horses themselves being shod at starting with extra strong shoes, tipped with steel. We had now only seven saddle-horses; so that one of the party was always on foot by turns of an hour each. It had been originally intended that the *Dolphin* should proceed to Roebuck Bay and meet us there; but it was now so late in the season, that I did not deem it prudent to run the risk of removing her to an unknown anchorage, where it was possible we might not be able to reach, and thus lay ourselves open to the probability of a very embarrassing uncertainty. The result proved we had adopted the right course. (*Bivouac.*)

30th.—This morning we crossed the marsh with some difficulty, as all the pack-horses but three fell and stuck in the mud, until we transferred their loads to our own backs and carried them through half a mile of the softest part. This operation detained us so long, that we did not make more than 18 miles, when we found a little water left in the pool seen on the 18th. (*Camp 48.*)

31st.—Started at 8 A.M., following our own tracks to 3 h. 30 m. P.M., when we turned to the south up a stream-bed crossed on the 17th. At the gorge where it issued from the granite ranges, we found a fine pool of permanent water and abundance of beautiful green grass. This stream was now named the Harding, and as the packs were heavy, we remained here the rest of the afternoon. (*Camp 49.*)

August 1.—Passing under the northern foot of the granite ranges on an easterly course for 16 miles, we came upon a fine reach of open water in a branch of the creek on which we had encamped on the 16th July. This pool was a valuable discovery, as it would not only form a useful halting-place on our return, but, from being in the middle of a fertile plain, containing at least from 15,000 to 20,000 acres of arable land, equal in quality to the Greenhough Flats, the whole could, if necessary, be easily irrigated from this large natural reservoir, the highest part of the plain not being 30

feet above the water-level at the driest period of the year. This fine tract of country, in connection with the lands already seen almost adjoining on the eastern bank of the Sherlock, would in itself support a larger population than is at present contained in the whole of the colony of Western Australia. We had seen more kangaroo on these plains than on any other portion of our route; one that was shot resembled the *osphranter*, and was in very good order, the fur much thicker and softer than the common kangaroo of the western coast, and of a pale mouse colour. It weighed about 45 lbs. (Camp 50. Lat. $21^{\circ} 54' 18''$.)

2nd.—Proceeding eastward over grassy plains and stony ridges, at 13 miles we struck the Sherlock, only 2 miles below the pool at which we had left the horse Rocket, and hoped to find him improved by the rest; but on approaching the spot, the presence of crows and a wild dog gave indications of a different fate; we found him partly devoured within a few yards of where we left him, inflammation of the feet having most probably produced mortification. Pushing on till sunset, we arrived at our old camping ground (Camp 43) at the bend of the Sherlock. (Camp 51.)

3rd.—Followed up the left bank of the Sherlock to Camp 42, and found a little water still remaining in the Bird-cage pools, where we halted for 2 hours. At 1 h. 30 m. resumed an easterly route, across a sandy plain, yielding little but hakea and triodia. Five miles brought us to a large branch of the Sherlock, coming from the south-east, in which were several small permanent pools, surrounded by flags, at which we halted. (Camp 52. Lat. $21^{\circ} 7'$.)

4th (Sunday).—Although the feed here was very indifferent, yet, as we had again entered unexplored country, I was glad to make it a day of rest before entering upon the rather unpromising tract of country that lay in the onward route.

5th.—Making a rather late start, on account of the horses having strayed very far in search of feed, we steered for a bold range, bearing E.S.E., distant about 20 miles. At 4 miles crossed a dry channel coming from the S.S.E., and continued our course over a poor tract of country covered with triodia and a few acacia, large bare red granite rocks cropping out here and there. At one of these was a small water-hole, near which a native was hunting mice. Although at first alarmed, he soon told us, in answer to our inquiries, that we should find no water to the east, but plenty to the south, which we found to be correct, as we had to halt, after a very long day's march, in a dry ravine in the ranges for which we had been making. (Camp 53. Lat. $21^{\circ} 10' 35''$.)

6th.—Having reconnoitred the country for some miles a-head over-night, without finding water, it was no use leading our horses farther into the rugged defiles, where we might get entangled for

many hours; we accordingly struck to the south-west for 4 miles, when we came on a rocky pool of permanent water in the south-east branch of the Sherlock, just at the point where it emerges from the hills. Having watered the horses and given them an hour's rest, we followed up the stream to the south-east for 7 miles, when it divided into numerous small dry ravines in the heart of an elevated range of granite, capped with metamorphic sandstone; water having only been met with within the first mile from where we struck it. (*Camp 54.*)

7th.—The horses requiring water, we fell back upon the pool passed yesterday, where I decided upon leaving the bulk of the party for a day or two, while I explored the country for a pass to the eastward. (*Camp 55. Lat. $21^{\circ} 14' 28''$.*)

8th.—Taking with me Mr. Brown and Mr. Harding mounted, and one pack-horse carrying water, we struck through the hills to the eastward, and at 6 miles came upon a stream-bed that led us to the north-east 15 or 16 miles, when, finding it contained no water, we resumed an easterly course over an open sandy and stony plain, covered with triodia, for 12 miles, and encamped in poor feed without water. (*Camp 56. Lat. $21^{\circ} 4'$.*)

9th.—A heavy dew having fallen during the night, our horses were much refreshed, and we were enabled to proceed with the scanty supply of water carried with us. In an hour we struck upon the channel of a river, with a sandy bed, 300 yards wide, in which were a few pools of water, under a bold sandstone bluff, rising abruptly 300 feet from the plain. From the summit of this hill the river was observed to trend to the N.N.W. for 8 or 10 miles, and to come through a gap in a granite range 4 miles to the S.S.E., towards which we now turned our steps, across extensive beds of soft drift-sand brought down by the river. Cajeput and acacia trees occupied a large portion of the channel, and it was not until reaching the gorge in the range that grass was met with in sufficient quantities to supply our wants. Several large pools, teeming with water-fowl, occupied the whole of the valley, which here was fully a quarter of a mile wide. The remainder of the day I devoted to sketching and triangulating the country, while the horses were enjoying the benefit of the fine feed. (*Camp 57. Lat. $21^{\circ} 6' 26''$.*)

10th.—As this river, from its magnitude, afforded a fair chance of working to the south-east, I determined to bring forward the rest of the party. Having named this river the Yule, we returned to the depôt party by a somewhat shorter cut, making it in about 30 miles, which we accomplished by sundown.

11th (*Sunday*).—Party resting. Observed a set of lunars, which placed us in long. $118^{\circ} 3'$ east, the rate of the chronometer being still so irregular as to be almost useless.

12th.—To-day the whole party proceeded 24 miles towards the Yule, finding a small pool of water in a rocky ravine by the way, which we had missed on our former trip. Bivouacked in an open grassy plain, 6 miles short of the river.

13th.—Moved on to our camp of the 9th, and halted there for the remainder of the day. The latitude by meridian altitude of the sun I found to be $21^{\circ} 6' 22''$.

14th.—As travelling near the river was found to be very laborious, on account of the vast beds of loose drift-sand thrown up by the summer-floods, we steered to the s.s.e. for a pass in the ranges, about 20 miles distant, through which the river was supposed to come, but on reaching the hills, the river was observed to the westward; we accordingly altered our course to south-west, and struck it at about 6 miles, the character of the river being still the same, the aggregate width of the several channels amounting to nearly half a mile; water being procured in them by digging a few inches in the sand. The country passed over during the day was an open plain of light sandy loam, interspersed with bare granite rocks, cropping out at intervals of a few miles. Giant ant-hills, of from 10 to 16 feet in height, and 30 to 40 feet in circumference (a few of which had already been met with on our first trip), were here remarkably conspicuous, on account of their size and bright brick-red colour. An emu was shot during the day, while running at full speed, at the range of over 200 yards. (Camp 58. Lat. $21^{\circ} 23' 23''$.)

15th.—One of the horses was missing this morning; so that we did not start until 10 A.M., when the river was followed up to the south-east, through country the same as yesterday; halting for the night in lat. $21^{\circ} 32' 13''$. (Camp 59.)

16th.—Our average course to-day was nearly east, occasionally crossing channels coming from the south-east. Towards evening we found that the main channel, which it had been our intention to have followed, had escaped our observation to the southward, and we were only on a comparatively small tributary coming from a rugged range of hills to the eastward. Our object for the present not being to push too far into the interior, this tributary was followed until it broke up into numerous small valleys, in one of which water was obtained by digging 3 feet in the sand, amongst tolerable feed; the country having much improved in the course of the day. (Camp 60. Lat. $21^{\circ} 34'$.)

17th.—Soon after starting this morning, we came upon a camp of natives, but we could not prevail upon any of them to stop and hold parley with us. Four hours' travelling over rather rocky ground led us well into the range, which we found to consist of granite, capped with metamorphic sandstones, and broken up by dykes of variegated jasper. In a deep ravine at the foot of a cliff

we found a small pool of beautifully clear spring water, which was very acceptable, as the sun had now acquired considerable power, and the grasses were beginning to get very dry food for our horses. During the halt at this spring, Mr. Harding and myself ascended the highest part of the range, which was found to be 500 or 600 feet above the plain. From this elevation I was enabled to select our onward route, and obtain bearings to several useful summits for triangulation; a few hills to the s.s.e. being visible at the distance of 60 or 70 miles, which no doubt form a part of the continuation of the Hamersley Range. Resuming an east course, the culminating point of the range was soon passed, when we descended to the eastward down some deep and remarkably picturesque rocky glens, in which were found several springs and pools of water, leading down to a fine grassy flat, in which were growing some large flooded gum-trees. (*Camp 61.*)

18th (*Sunday*).—Found our lat. $21^{\circ} 36' 8''$, long. $119^{\circ} 13' E$. by account.

19th.—The country being very hilly, it was found best to follow down the stream upon which we had encamped, although it trended to the north of east. In a few miles the valley opened out with fine pools of permanent water, covered with numerous flights of ducks, and at 8 miles it joined a wide valley from the south, down which flowed a river, divided into several channels, containing many fine pools from 50 to 200 yards wide, which were still running gently from one to another. The banks, although well grassed, were very rocky, rendering travelling excessively fatiguing to our heavily-loaded pack-horses, several of them being bruised and strained while jumping from rock to rock, the clefts being too deep and narrow for them to walk between, and the ranges bordering the valley were too steep to admit of our leaving the river, which we were compelled to follow down to lat. $21^{\circ} 26' 52''$. (*Camp 62.*)

20th.—The river, which had been named the Strelley, continued to hold a northerly course; we therefore availed ourselves of a smoother valley coming in from the east to resume our old course. At 9 miles we met with a stream, 100 yards wide, coming from the south-east, evidently tributary to the Strelley, and taking its rise in elevated granite ranges, with black volcanic ridges protruding through them, but not to any considerable height above the general level of the country. After a few hours' scramble over these ridges, we came upon a small stream, trending east, containing several springs, surrounded by high grass and flags, gradually leading us, by sunset, into a deep pass, walled in by cliffs and bluffs from 100 to 300 feet high; the stream, having joined several larger ones from the southward, now occupying nearly the whole width of the valley. We encamped in one of the

wildest and most romantic-looking spots to be found in this part of Australia, to which we gave the name of Glen Herring, from a fish bearing a resemblance to a herring being found in the stream. (*Camp 63. Lat. $21^{\circ} 20' 35''$.*)

21st.—With some difficulty we wended our way down the intricate windings of the glen for 6 miles in a north-east direction, when it opened out into grassy flats, turning to the northward. Leaving it at this point, a mile east brought us to the bank of a fine open river-bed 200 yards wide, down which a little water was still flowing, the country on its banks becoming much more promising, and grass plentiful. This river I named the Shaw, and some beautiful grassy plains through which it came for 20 or 30 miles to the southward, Norton Plains, after the talented Secretary of the Royal Geographical Society. In the afternoon a large tributary from the south-east was followed up for some miles, when, turning to the south, we quitted it, to follow an open valley leading east, towards a bold granite and schistose range, under which we encamped late, without finding water. (*Camp 64. Lat. $21^{\circ} 20'$.*)

22nd.—As we did not find water for some distance to the eastward under the foot of the hills, we turned to the south-east, quickly emerging from the hills upon the Norton Plains, and at 2 miles came upon the stream quitted last evening, to which the name of Emu Creek had been given. It had altered its course, and was again coming from the east, and contained several fine springs. This creek was followed up for the rest of the day, through a rather indifferent country, and, towards nightfall, led us into a deep rocky ravine, in which we encamped, a small supply of water being obtained from holes in the rocks. (*Camp 65. Lat. $21^{\circ} 28'$.*)

23rd.—As we advanced, the ravine divided into many branches coming from an elevated table-land to the southward; we therefore again resumed an easterly course for 5 or 6 miles, over rugged hills, and descended by a gully trending north-east, which led us in a few miles into open plains. Skirting the northern foot of the range until after dark, we encamped on a small watercourse, in which we obtained water by digging under some granite rocks. (*Camp 66. Lat. $21^{\circ} 23' 30''$.*)

24th.—The horses having suffered much amongst the rocks during the last few days, I determined to follow the southern edge of the plain until a stream could be met with to lead us to the south-east. A few miles brought us to a small watercourse running gently from some springs in the plain, which, contrary to our expectations, ran into the ranges to the south-east, instead of coming out of them. As here there was plenty of green grass and

water, and the horses were not looking well, we encamped early in the entrance of the gorge. (*Camp 67.* Lat. $21^{\circ} 20' 13''$.)

25th (*Sunday*).—Long., by observation, $120^{\circ} 17'$; var., $30'$ E.

26th.—The stream we were upon led us about 5 miles south-east through the hills, and then joined a river coming from the southward, 100 yards wide, which was followed down on an average course of E.N.E. to lat. $21^{\circ} 18'$; reeds and rank grass lining its banks in many parts, while in others granite boulders and banks of drift-sand offered considerable impediments to travelling. (*Camp 68.*)

27th.—The river took us on a northerly course 9 or 10 miles, receiving many large tributaries, several of them still running slightly, forming altogether a stream of some importance, which, on account of the large extent of pastoral and agricultural lands afterwards found on its banks lower down, and its many fine tributaries, I named the DeGrey, in honour of the noble Lord who took a lively interest in promoting the objects of the Expedition. As the object at present in view was to push to the south-east, we left this promising river and resumed an E.S.E. course, for 5 or 6 miles, into a hilly country, and encamped in a gully with rather scanty feed, a little water being obtained by digging. (*Camp 69.*)

28th.—We soon became involved in deep ravines, which led up into high table-land, the summit of which was no sooner obtained than we had again to descend equally precipitous gullies to the eastward, the horses sliding down amongst the loose rocks and stones with a velocity that threatened immediate destruction; they all, however, arrived safe at the bottom, although in so exhausted a state that two of them had very shortly after to be left behind, while we pushed on with the rest in search of water and feed, which was not met with until late in the day. After a short rest, I sent Messrs. Brown and Brockman back for the two beaten horses, while I moved the party on a mile farther to a fine spring in a grassy flat, where we encamped. (*Camp 70.* Lat. $21^{\circ} 9' 3''$.)

29th.—The two horses left yesterday were brought into camp early in the day, and as they were too weak to carry their loads, they were placed on our saddle-horses, one of the party by turns having to walk. As the season was rapidly advancing, we could not venture to incur any delay, much as the horses required rest, and accordingly resumed an east course late in the day. At 5 miles came upon a sandy stream-bed, 50 yards wide, trending to the north-east, beyond which the country opened out into an extensive plain of white waving grass—to the north uninterrupted by a single elevation; while to the east and south, at 8 or 10 miles distant, rose ranges of granite hills, capped with horizontal sand-

stones. It was not until some time after dark that we arrived near the opposite edge of the plain, when we came upon a river, 200 yards wide, running to the northward. The long drought had reduced it to a few shallow pools, running from one to the other through the deep sand in the bed; magnificent cajeput-trees lined the banks, and grass was in abundance. (*Camp 71.*)

30th.—We did not start till late, as Mr. Brown had to go back some little distance for his horse, which had been again left behind over-night, knocked up. As it would have been useless, in the present condition of our horses, to attempt at once to enter the ranges to the east, we determined to follow up the river for a few days to the s.s.e., and by so doing secure feed and water, and give the poor animals a chance of recovering their strength; we therefore followed the river up for 7 or 8 miles, through fine open forest country, and encamped near a deep pool, in which were caught ten or twelve dozen of small trout, which, with cockatoos and ducks, afforded an important addition to our ration of only seven ounces of meat. This river was named the Oakover. (*Camp 72.*)

31st.—For nearly 10 miles the river continued to lead us to the eastward of south; it then divided, the main channel coming from the south-west; we, however, followed the eastern branch until quite satisfied that it contained no water, and then fell back to the westward, striking the river near some cliffs, at the foot of which water was plentiful. Although only 1 p.m., I determined to halt for the remainder of the day, as it was too late to make an attempt to enter the hills without giving the horses the advantage of some hours' feed and rest. It also afforded me leisure to make astronomical observations and work up the plans of our route. A set of lunar distances, very carefully taken, placed the camp in long. $121^{\circ} 3' 30''$ E., while that by account, carried on by triangulation and dead reckoning from the Sherlock, placed us $4\frac{1}{2}$ miles more to the westward; the latitude being $21^{\circ} 23' 43''$. (*Camp 73.*)

September 1st (*Sunday*).—Read prayers.

2nd.—A march of 3 hours across the plains to the eastward brought us to the foot of the range, which we entered by a tolerably easy pass, and soon came upon a pool of water in a tributary to the Oakover, the mouth of which had been passed on our ascent of that river. Here we halted for two hours, and then resumed our route through steep and rocky hills, containing numerous fine springs. It was not until 7 p.m. that we finally got through the ranges, and emerged upon open sandy plains of vast extent, no object being observable from N.N.E. round to s.s.e., except low ridges of red drift-sand, in many parts nearly bare of vegetation. A large party of natives were encamped upon the watercourse down which we descended to the plain. Not wishing to alarm them, we passed the water-holes from which they were supplied, and pro-

ceeded a mile farther, but had in consequence to encamp without water, although amongst abundance of grass. (Camp 74. Lat. $21^{\circ} 21' 30''$.)

3rd.—This morning we returned to the native encampment for water, and found that they had already deserted it, leaving many of their things behind—amongst others, a very singular headdress, shaped like a helmet. It consisted of a circular band, made of twisted grass, the size of the head, into which were stuck ten or twelve upright twigs, brought together into a point 2 feet high, which was woven like an open basket, with yarn made of opossum-fur; the whole, no doubt, being considered highly ornamental by the wearers, but of not the least service as an article of protection for the head, either from the sun or in war. Having watered the horses, we entered the sand-plain, travelling between the ridges, which ran in straight lines parallel to each other, at the distance of several hundred yards apart, the sand being thrown by the south-east gales into acute ridges, 30 to 60 feet high, their direction being almost invariably N. 109° E. Travelling to 25 h. 15 min., P.M., we got over about 18 miles, the valleys yielding little else but triodia, with occasional patches of stunted gum-forest, in which was found a little good grass, on which were feeding flights of pigeons and a variety of parrot, new to us, but which I believe to be the "golden-backed" parakeet (*Psephotus chrysopterygius*) of Gould. As no water could be found, and many of the horses gave signs of being greatly distressed, no change being observable in the country for many miles ahead, a few very distant ranges being the only objects visible, we were obliged to have recourse to the only safe expedient of falling back and forming a depôt. Resting to 5 h. 10 m., we commenced a retreat until 7 h. 20 m., having been obliged to abandon a horse of Mr. Brown's, quite exhausted. (Camp 75.)

4th.—At 6 h. 30 m. resumed our retreat, and by noon arrived at the water-hole of the 2nd, having left two more horses behind, which, however, Mr. Brown and myself carried out water to in the course of the evening and drove them in during the night.

5th.—Leaving the party to rest, I walked 10 or 12 miles round to the south-south-eastward along the foot of the range in search of water, and to ascertain if a better line of country could be found in that direction: but it continued to maintain the same arid appearance, and I only came on one pool, in a gully about $\frac{1}{2}$ miles from the camp. (Depôt.)

6th.—Leaving Mr. Turner and four of the party in depôt, with instructions to remain there 3 days, and then fall back upon the Oakover, where there was much better feed, I started with Messrs. Brown and Harding, taking 6 of the strongest horses, 16 days' rations, and 6 gallons of water, and steered S.S.E. along the ranges

for 6 or 8 miles, looking for some stream-bed that might lead us through the plains, but was disappointed to find that they were all lost in the first mile after leaving the hills, and as crossing the numerous ridges of sand proved very fatiguing to the horses, we determined once more to attempt to strike to the eastward between the ridges, which we did for 15 miles, when our horses again showed signs of failing us, which left us the only alternative of either pushing on at all hazards to a distant range that was now just visible to the eastward, where, from the numerous native fires and general depression of the country, there was every reason to think a large river would be found to exist, or to make for some deep rocky gorges in the granite hills 10 miles to the south, in which there was every prospect of finding water. In the former case the travelling would be smoothest, but the distance so great that, in the event of our failing to obtain water, we probably should not succeed in bringing back one of our horses; while in the latter we should have to climb over the sand-ridges, which we had already found so fatiguing. This course, however, involved the least amount of risk, and we accordingly struck south 4 miles, and halted for the night. (*Camp 76.*)

7th.—The horses did not look much refreshed by the night's rest: we therefore divided 3 gallons of water amongst them, and started off early, in the hope of reaching the ranges by noon; but we had not gone 3 miles when one of the packhorses, that was carrying less than 40 lbs. weight, began to fail, and the load was placed upon my saddle-horse. It did not, however, enable him to get on more than a couple of miles farther, when we were compelled to abandon him, leaving him under the shade of the only tree we could find, in the hope that we might bring back water to his relief. Finding that it would be many hours before the horses could be got on to the hills, I started ahead on foot, leaving Messrs. Brown and Harding to come on gently, while I was to make a signal by fires if successful in finding water. Two hours' heavy toil through the sand, under a broiling sun, brought me to the ranges, where I continued to hunt up one ravine after another until 5 P.M. without success. Twelve hours' almost incessant walking, on a scanty breakfast, and without water, with the thermometer over 100° of Fahrenheit, began to tell upon me rather severely; so much so, that by the time I had tracked up my companions (who had reached the hills by 1 P.M., and were anxiously waiting for me), it was as much as I could do to carry my rifle and accoutrements. The horses were looking truly wretched, and I was convinced that the only chance of saving them, if water was not found, would be by abandoning our packsaddles, provisions, and everything we could possibly spare, and try and recover them afterwards if practicable; we therefore encamped for the night on

the last plot of grass we could find, and proceeded to make our arrangements for an early start in the morning. There was still remaining a few pints of water in the kegs, having been very sparing in the use of it; this enabled us to have a little tea and make a small quantity of damper, of which we all stood in much need. (*Camp 77.*)

8th.—At 4 A.M. we were again up. Having disposed of our equipment and provisions, except our riding-saddles, instruments, and firearms, by suspending them in the branches of a large tree, we divided a pint of water for our breakfast, and by the first peep of dawn were driving our famished horses before us at their best speed towards the *dépôt*, which was now 32 miles distant. For the first 8 miles they went on pretty well, but the moment the sun began to have power they flagged greatly, and it was not long before we were obliged to relinquish another horse quite unable to proceed. By 9 A.M. I found that my previous day's march, and the small allowance of food I had taken, were beginning to tell upon me, and that it was probable I could not reach the *dépôt* until next morning, by which time the party left there were to fall back to the Oakover; I therefore directed Mr. Brown, who was somewhat fresher than myself, to push on for the camp and to bring out fresh horses with water, while Mr. Harding and myself would do our best to bring on any straggling horses that could not keep up with him. By dark we had succeeded in reaching to within 9 miles of the *dépôt*; finding unmistakeable evidence, towards evening, of the condition to which the horses taken on by Mr. Brown were reduced, by the saddles, guns, hobbles, and even bridles, scattered along the line of march, which had been taken off to enable them to go on a few miles farther.

9th.—At dawn, Mr. Harding and myself got up from our beds of sand, stiff and giddy, but much refreshed by the cold night-air. In 4 or 5 miles we met Mr. Brown with fresh horses and a supply of water, having succeeded in reaching the *dépôt* at 8 P.M. the night before, with only one horse. We were now enabled to proceed with the tracking up of the horses left over-night, which, after resting some hours, had commenced to ramble in search of water; Mr. Brown returning on our route and recovering the saddles and firearms left the previous evening, the stores abandoned the day before being too far off to attempt their recovery. By 8 h. 30 m. P.M. we had all returned to the *dépôt*, having tracked up the three missing horses, the two left at the farthest point being too distant to carry relief to without incurring the risk of further loss. I cannot omit to remark the singular effects of excessive thirst upon the eyes of the horses; they absolutely sank into their heads until there was a hollow of sufficient depth to entirely bury the thumb in it, and there was an appearance as though the whole of

he head had shrunk with them, producing a very unpleasant and ghastly expression. (*Dépôt Camp.*)

10th.—We were only able to move the camp a mile to another water-hole, for the sake of a little better feed. (*Bivouac.*)

11th.—On taking into consideration the reduced number and strength of our horses, it was quite evident that we had but little prospect of being able to cross the tract of dry sandy country that had already occasioned us so much loss and trouble; yet there were many reasons to stimulate us to make the attempt. Not only had we now attained to within a very few miles of the longitude in which, from various geographical data, there are just grounds for believing a large river may be found to exist, draining Central Australia, but the character of the country appeared strongly to indicate the vicinity of such a feature; added to which, the gradual decline in the elevation of the country, notwithstanding our increasing distance from the coast, tended towards the same conclusion. Nor should we omit the strong evidences, that the remarkable ridges of drift-sand which encumbered the plains must, in the first instance, have been brought from the interior by water, and then have been blown by the strong prevailing south-east winds across the country, in a direction at least 50° from that which they originally came from. This, with the clean, waterworn appearance of the sand, the bold outlines of the hills seen to the far east, and the number of native fires observed in the same direction, must all tend to support the hypothesis that the western half of Australia is probably drained by a large river in about this meridian. I could not, therefore, help regretting, more than ever, that we should be driven back at such an interesting spot, but mature reflection convinced me that any further attempt, with our present means, at this period of the year, was almost certain to be attended with the most disastrous results. I therefore decided upon adopting the only other useful course open to us—that of examining down to the sea the rivers already discovered. With this in view, we to-day fell back 5 or 6 miles across the ranges to a tributary to the Oakover called the Davis, when one of the horses became so crippled by a strain in the loins that we were obliged to halt to give him a chance of recovery; affording me leisure to verify our position by observing another set of lunar distances, which I found to agree well with those formerly taken 10 miles to the westward. (*Camp 78.*)

12th.—We commenced the descent of the Davis, having much difficulty in getting along the sick horse, as it required the united strength of the party to lift him on his legs every time he fell, which he at last did so frequently that I ordered him to be shot, as it was hopeless to attempt to bring him on, and, if left, he must have died of starvation. By 2 P.M. we reached the junction of the

stream we were upon with the Oakover, and halted 2 miles south of Camp 72, most of the party being now dismounted, and shoe-leather was beginning to get very scarce with us. (*Camp 79.*)

13th.—This day we only travelled 8 miles down the Oakover, and encamped near a deep creek, in which was caught a good haul of fish. (*Camp 80.*)

14th.—The feed was so good on this river that we were able to proceed to-day to latitude $20^{\circ} 59' 33''$; the country improving much, grassy flats extending for some miles to the northward; the channel of the river being augmented by the junction of the large tributary crossed on our eastward track on the afternoon of the 29th of August. (*Camp 81.*)

15th (*Sunday*).—Remained in camp to rest the horses. A few natives were seen near the camp during the day.

16th.—After running 4 or 5 miles farther north, the Oakover turned to the north-west for 14 miles, having a clear sandy or stony bed from 150 to 200 yards wide, water and grass being plentiful, and the country generally being open forest, with a pleasing appearance. (*Camp 82. Lat. $20^{\circ} 46'$.*)

17th.—The course of the river was followed for about 17 miles in a westerly direction, the bed widening out to 300 or 400 yards, the water being now confined to a sandy channel not above 150 yards in width, the depth of the valley through which it runs being about 40 feet; timber of white gum and cajuput is tolerably plentiful on the banks, the soil of which is a red loam of considerable depth. Many of the pools are lined with tall reeds. (*Camp 83. Lat. $20^{\circ} 41' 32''$.*)

18th.—Started at 6 h. 40 m. A.M., and in $2\frac{1}{2}$ hours entered a deep and wild-looking gorge, at which point it formed a junction with the DeGrey, coming from the s.s.e., through a beautiful level tract of open grassy country, a broad belt of flooded gum-trees growing for some distance back on either side. Passing through the gorge, which was a quarter of a mile wide and about a mile long, we came upon a camp of natives, who, as usual, quickly dispersed without giving us an opportunity of showing them that we intended them no harm. The river here contains a fine reach of deep water, upon which was a large quantity of whistling ducks and other water-fowl. Two miles lower down we halted on the banks of a deep creek coming in from the northward; the rest of the day being employed restuffing packsaddles, &c., while some of the party caught a quantity of fine fish—amongst them an eel, which, however, was allowed to escape, being taken for a water-snake by one of the party who had never seen one before. A large kind of bat, or vampire, was first observed here, measuring about 2 feet across the wings. (*Camp 84.*)

19th.—We continued to follow down the DeGrey for about 18

miles in a W.N.W. direction, through open grassy plains extending for many miles on either bank, the channel of the river still maintaining the same sandy character, and with abundance of water in its bed. (*Camp 85. Lat. 20° 36' 30".*)

20th.—There was little or no change in the appearance of the country for the 18 or 20 miles that the river was traced down during to-day. We encamped on the bank of a wide and deep reach of water, more than a mile long, surrounded by tall reeds. Fish were caught here in great abundance. (*Camp 86. Lat. 20° 31' 48".*)

21st.—Shortly after starting, we crossed the bed of a tributary coming in from the southward, with a shallow sandy channel, 200 yards wide, which must drain the high ranges between the DeGrey and Shaw rivers, which we passed over on our outward track. In many places we began to observe patches of triodia in the midst of the alluvial plains through which the river continued to run, and distant ranges were observed both to the north and south. Towards sundown we surprised a large party of natives encamped in a dry channel of the river, and approached so near before we were discovered that we had separated a young child from the rest of the party, which was observed by the mother, who remained while the rest of the natives made a hasty retreat; it was not long, however, before an aged warrior returned to her aid, with his spear shipped, and came forward in a very menacing attitude to recover the child, who stood by us with a look of the most perfect unconcern. Finding we took no notice of his threats, he threw down his weapon, and, walking up to the boy, caught him up in his arms and bore him off with a look of triumph to his companions. No attempt was made to carry away their supper, which was ready prepared in a number of wooden scoops, and consisted of fish, rats, beans, grass-seed cakes, and a beverage made with some oily seed, pounded. Leaving everything undisturbed, we pushed on for another mile, so as to prevent their being afraid of returning to their evening repast. (*Camp 87. Lat. 20° 25' 15".*)

22nd.—Being Sunday, we only moved a mile lower down the river to a fine reach of water, on the banks of which was a rich sward of green grass for our horses. Shortly after we had made ourselves comfortable for the day, we were startled by six of the horses coming into camp at a gallop in their hobbles, followed by eighteen armed natives. Every one sprang to their arms in a moment, which caused the intruders to fall back. I tried to make them comprehend that we did not approve of the horses being hunted, but as they would not go away, and they had a stronger party concealed in the brushwood, I fired at a tree to show them the use of our arms. The moment they heard the report of the rifle and saw the splinters fly they took to their heels,

and did not again trouble us. We afterwards found a spear sticking in the ground in the track of the horses, having evidently been thrown while in pursuit. (*Camp* 88. Lat. $20^{\circ} 25'$, long. $119^{\circ} 21'$.)

23rd.—The river soon passed round the southern foot of a range of hills of 400 or 500 feet elevation, the country to the south again becoming very fertile, and clothed with a rich sward of kangaroo-grass. At 10 miles we struck the Shaw River, coming from the south-east, with a broad, deep, and well-defined channel, in which were many fine pools of water. Below the confluence of the rivers the DeGrey widened out considerably, turning rather more to the northward, and 7 miles farther was joined by the Strelley, in lat. $20^{\circ} 16'$, and long. $119^{\circ} 5' E.$; the river being diverted to the northward by a rugged range of volcanic hills; its course being now direct for Breaker Inlet, which was distant about 18 miles. (*Camp* 89.)

24th.—As it was very important that I should obtain a round of bearings before proceeding any farther, the country having for some days past been too flat to afford many opportunities for triangulation, I to-day started with Messrs. Harding and Brown to ascend the ranges that lie to the west of the river. A scramble of 3 miles over very rugged rocks brought us to the highest point, which was found to be not more than 500 feet above the sea; our journey, however, turned out to be fruitless, the magnetic attraction of the volcanic rocks of which the hills are composed being so great as to reverse the needle, which varied so much that I could not even make use of the compass to take angles, and I had omitted to bring a sextant. Kangaroo were numerous among these hills, but we did not succeed in shooting any; they appear to be similar to those seen on the plains near the Sherlock. The view we had of the country was very extensive. To the south is a vast gently-undulating plain, only occasionally interrupted by detached granite and sandstone peaks; while narrow green lines of trees intersecting the plain in various directions indicate the watercourses coming from the distant ranges, and wander in wide sandy channels towards the sea; the course of the Strelley being easily distinguished for many miles. To the north the eye could trace the broad sandy bed of the DeGrey, trending towards Breaker Inlet, the position of which was only distinguishable by the margin of deep-blue mangroves that line it, and the whole extremity of the delta formed by the alluvial deposits brought down by the river. To the east and west of this is a wide expanse of alluvial flats, covered in most parts with rich waving grass, the sameness of the scenery being relieved by detached patches of open park-like forest of flooded gum. Returning to the camp by noon, the remainder of the day was devoted by me to bringing up the arrears of mapping,

&c., and by the party generally in providing a supply of fish and ducks, which here were found to be very plentiful.

25th.—By 7 A.M. we were once more tracing down the DeGrey through the flats seen yesterday. At 8 miles the river divided into two channels of nearly equal width, the eastern one being followed to lat. $20^{\circ} 5' 16''$, travelling being very heavy, on account of the numerous rat-holes that completely undermine the banks of the river for more than a quarter of a mile back on either side. For the last few miles the water in the river was decidedly brackish, and at our camp was evidently influenced by the tides; we, however, procured some tolerably good water by sinking a well in a sand-bank in the dry portion of the channel, which here was about 300 yards wide. (*Camp 90.*)

26th.—This morning we found the water in the well quite salt, in consequence of the tide having risen during the night; and as our horses required water, it was found desirable to fall back upon some of the fresh pools to form a camp, while a day or two could be devoted to the examination of this fertile and interesting tract of country. We accordingly crossed the channel and proceeded westward for nearly 3 miles, when we came upon the other branch, which proved eventually to join again several miles below, forming an island, containing some 8,000 or 9,000 acres of alluvial flat soil, covered with a quantity of mixed grasses. To this was given the name of Ripon Island. The western channel was found to be over 300 yards wide, and to contain several fine reaches of open water, some fresh and others slightly brackish; they all were teeming with ducks and a great variety of waterfowl. Having selected a suitable spot for a camp, I started with Messrs. Brown and Harding to examine the country towards the inlet. At a little more than two miles we crossed the river between two pools of salt water, subject to the influence of the tides, and proceeded northward over an open grassy flat for two miles farther, when the grass gave place to samphire and small mangrove bushes, which gradually thickened to dense mangroves, cut up by deep muddy creeks, which put a stop to proceeding farther in that direction. Here we observed several remarkable stacks of dead mangroves, evidently piled together by the natives, but for what purpose we could not ascertain, unless to escape upon from the tide when fishing. Having gained firm ground, we made a *détour* more to the eastward, and at last succeeded in reaching the bank of the river close to the head of the inlet. The tide being at the ebb, I was able to walk over the mud and sand to the mouth of the river, and obtain bearings to Points Larrey and Poissonier, and observe the character of the entrance, from which I formed the opinion that the breakers seen by Captain Stokes when surveying this portion of the coast, and which deterred him from entering the inlet, were

nothing more than the sea-rollers meeting a strong ebb tide setting out of the DeGrey, possibly backed up by freshes from the interior, which would, from a river of this size, occasion a considerable commotion, where the tide amounts to 20 feet; at any rate I could not observe any rocks, and there appeared to be a channel with at least 5 or 6 feet of water in it at low tide. For the first mile the river has a breadth of from 400 to 800 yards, and would admit, with the tide, vessels of 12 or 14 feet draught of water with perfect safety up as far as Ripon Island, where they could lie completely sheltered in all weathers quite close to the shore, which here has steep banks 20 to 30 feet high; they would, however, be left aground at low water, as we did not observe any deep pools in this part of the river. I had only just time to complete my observations when the roaring of the in-coming tide warned me that no time was to be lost in returning to the horses, which were nearly a mile higher up the river. Although I ran part of the way, the mud creeks filled up so rapidly, that there was some risk of my being cut off from the shore, and having to take up a roost on the top of the mangroves until the tide fell; I had time, however, to observe that the head of the tide carried with it thousands of fish of great variety, amongst them a very remarkable one from 3 to 6 inches in length, in form resembling a mullet, but with fins like a flying-fish; it is amphibious, landing on the mud and running with the speed of a lizard, and when frightened can jump 5 or 6 feet at a bound; I did not, however, succeed in capturing one for a specimen. Swarms of beautiful bright crimson crabs, about 2 inches diameter, were to be seen issuing from their holes to welcome the coming flood, on which was borne a great number of sea-fowl, which, it was evident, came in for an abundant feast in the general turmoil. Mounting our horses, that had stood for the last two hours without touching a mouthful of the rank grass around them for want of water, we returned to the camp by a different route, through open grassy flats bordering the deep reaches of water that encompass the s.w. side of Ripon Island.

27th.—Accompanied by the same party, but with three fresh horses, we again started to explore the plains eastward towards Mount Blaze. For several miles after leaving the island the country continued of the same fertile character as that passed over yesterday, and is at times subject to inundation from the river; but as we receded from the influence of the floods the soil became lighter and the grass thinner, with patches of triodia and samphire. At 12 miles we entered a patch of open grassy forest, extending for some miles, but as there was no promise of obtaining water, and the day was calm and sultry, we turned to the northward, in the hope that water might be procurable under the low sand-hills that line this portion of the coast; in this we were, however, disappointed,

as the fall of the country terminated in mangroves and salt-water creeks, between which and the sea is a narrow ridge of low sand-hills. Amongst them we observed many tracks of natives, but did not discover any water. The sea here is apparently very shallow for many miles off-shore, more than half a mile of mud and sand-bank being left dry at low-water. Resting the horses for two hours we returned to camp by a more direct route, passing for several miles over a plain of rich black mould, covered with a short sward of bright green grass, the native fires having swept off the dry grass a few weeks previously; and although there had been no rain since, the heavy dews that fall during the night in these latitudes had been sufficient to produce a rapid growth.

28th.—As I expected to meet with some difficulties for want of water between this and the Yule River, I thought it best to give the horses the benefit of a little rest before resuming our homeward route. Some of the party were also deriving much benefit from the abundance of fresh game, as they had been suffering from debility, brought on most probably by over-exertion while traversing the heavy country of the interior. While here we obtained several additions to our small collection of birds—amongst them a beautiful wader, the size of a large snipe, the head being covered by a remarkable membrane hood or sheath of a rich gamboge yellow, resembling the leaf of a flower falling back from the beak, and lying close over the feathers, protecting them when the beak is plunged into the sand after food; they had also a remarkable sharp horn or claw projecting forward from the last joint of the wing, with which they can fight when attacked by birds of prey. A very handsome bird was also shot, resembling a flamingo: the body being about the size, and in plumage like a pelican; the head and neck of a deep rich purple, and formed like the flamingo; the legs bright red, long and slender; it flies extended to its greatest length, measuring 6 feet 2 inches, and across the wings 7 feet 2 inches; its weight being only 11 lbs. A white heron, with bird-of-paradise feathers on its back, was occasionally seen, but only one specimen procured.

29th (*Sunday*).

30th.—We made an early start up the river, and at 3 miles struck out into the plains to the westward, where we found a large extent of open flat, yielding grass and atriplex, and timbered in many parts with flooded gums. At 10 miles we came upon a deep reach of water flowing to the north-west, which must empty itself into the sea 4 or 5 miles to the south-west of Spit Point, forming an island of a portion of the delta of the DeGrey, containing between 90,000 and 100,000 acres of alluvial land. This channel was followed up, and found to come from the river, close to the junction of the Strelley, and must be a very considerable outlet for

the water during the summer rains. I regretted much not having time to trace this branch of the DeGrey to its mouth, as it might be found to be navigable, and afford a fine site for a seaport town. Fresh water is abundant, and building stone procurable in any quantity, being found in the immediate vicinity, on land superior to inundation. We remained at the junction the rest of the day. (*Camp 92.*)

October 1st.—As the plains were now dry and parched, we determined to follow up the Strelley to the ranges before striking west to the Yule. At first the river spread out into so many wide grassy channels that it was difficult to trace it; but at 4 or 5 miles collected into one bed, about 100 yards wide, in which were a few small pools. Up to this point the country had been fertile, the soil being an alluvial clay, resulting from volcanic rocks; but after getting clear of the line of hills the soil became poor and hungry, yielding little else but triodia and acacia-bushes. Water was procured in several places in the course of the day's march, our course having been nearly due south. (*Camp 93. Lat. 20° 32' 30".*)

2nd.—The river led us this morning a little to the eastward of south, through a country very similar to yesterday. Late in the day we crossed a considerable tributary coming from the south-east, which was now quite dry, and takes its rise in a bold range of granite-hills now visible to the southward, at the distance of 10 or 12 miles, and forms a part of the main table-land of this part of the coast; the plain we had been passing over being only a sea flat, with a few detached ranges widely scattered over its surface. The river now began to trend to the westward, granite rocks showing themselves on the surface in large masses. Water was occasionally procurable, which was very important, as the horses could not travel many hours without it, although the heaviest packs were reduced below 100 lbs. We had now only 6 saddle-horses, so that two of the party had to walk by turns for an hour at a time. We halted late in lat. 20° 45' 17". (*Camp 94.*)

3rd.—Started at 6 h. 30 m., and in an hour came upon a fine pool in the granite, which was very acceptable, as we had encamped over-night without any water. The channel of the river here deepened considerably, was full of rocks, and contained plenty of water. Skirting the ranges for some distance several tributaries joined from the southward. The country, although rocky, improved much in general appearance; grass was abundant, and game frequently met with. At night we encamped on a small pool in the bed of the river, about 5 miles from the foot of the range. Cockatoos and pigeons came in great numbers to drink at the pool about sundown. (*Camp 95. Lat. 20° 56' 33", long. 119° 10' by account.*)

4th.—Made an early start, and travelled 4 miles on a south-west

course, when the river divided into two channels, the main one coming from a deep gorge to the S.S.E., exactly in the direction in which we had left the Strelley on our outward route, at a distance of about 30 miles, identifying the stream with some degree of certainty. Taking the western branch, which would lead us towards the Yule, we followed it up until long past noon into a hilly country, without meeting with water; we, however, saw a large extent of fine grazing-land, which would make an excellent summer station when the flats were inundated. Having rested during the heat of the day, which had lately become rather oppressive, we resumed a westerly course, having run out the head watercourses of the western branch of the Strelley. A few miles brought us to a considerable stream-bed trending to the north-west, which was followed down till some time after dark, having procured a few gallons of water from a native well in the bed of a creek. To-day we had travelled for nine hours, and accomplished a distance of 22 miles, the longest day's march we had made for many weeks past. Early in the day we had noticed what we took for a great number of native fires springing up in all directions, and quickly to die away again; we, however, found it to be a number of whirlwinds, carrying with them huge columns of charcoal and dust, which traversed the plains sometimes for miles before they broke. (*Camp 96. Lat. 21° 4'.*)

5th.—Our computed distance from the Yule was now only 21 miles, and the country promised well for travelling, but the long march yesterday and the short allowance of water rendered it very doubtful whether some of the horses would hold out long enough to reach it; we therefore had our breakfast before daylight, and as soon as we could see resumed our route to the westward. At 5 miles we crossed a sandy channel 200 yards wide, full of cajeput and gum-trees; but as we did not soon find any water in it, pushed on at a rapid pace, and in 2 miles crossed a similar channel, 100 yards wide, trending north-west, and running parallel to the first. Beyond this the ground became rocky for a few miles, and by the time we had gone rather more than 12 miles, Mr. Burges's mare, Lucy, could go no farther. Giving her half a gallon of water out of the little stock carried with us, I left Messrs. Brown and Harding to bring her on when rested, and with the rest of the party continued our route. A mile or two farther, and another horse, Bob, was knocked up and left behind, having also had some water given him. With considerable difficulty we succeeded in getting the rest of the horses on to the Yule by 1 h. 30 m. P.M., making it close to our camp of 13th August. Had the distance been 10 miles farther, probably not more than three or four of the horses would have ever reached it, so much were they reduced in strength. On reaching the pool several of the horses, notwithstanding our efforts to prevent them,

rushed headlong into the water with their packs on, and drank so much of it that it was with great difficulty we could drag them out again. In the course of the afternoon Messrs. Brown and Harding came in with the horse Bob, but had not been able to get the mare on more than 2 or 3 miles. Being anxious, however, not to lose her, I sent M^cCourt and James with two of the strongest horses, carrying 4 gallons of water for her, after which they succeeded in getting her into camp by midnight. (*Camp 97.*)

6th (*Sunday*).—Moved a short distance down the river to Camp 57, for better feed.

7th.—As the distance from the Yule to the last known permanent water on the eastern branch of the Sherlock is over 25 miles, and our means of carrying water very limited since abandoning our largest pair of kegs in the retreat on the 8th September, I to-day set to work and soldered up a number of preserved-meat tins that had been carefully opened and kept for this purpose, putting a small spout to each. Eight of these (4-lb. tins) we found to contain something over 4 gallons, which, added to our water-belts and the two remaining kegs, would provide for the conveyance of 12 gallons of water, which I hoped would prove sufficient to enable us to pass the dry tract of country in safety, as it would allow half a gallon to each horse, and an ample supply for the party for two days. I also succeeded in repairing the aneroid barometer, which had been crushed nearly flat by the fall of a horse; fortunately, however, without injury to the vacuum vase.

8th.—Having rearranged the loads and lightened them by leaving hid amongst the rocks a pack-saddle and 60 lbs. weight of horse-shoes and nails, at 3 h. 45 m. P.M. we commenced a retreat on our outward tracks of the 13th August, travelling to 7 h. 15 m., when we encamped on a patch of tolerably good grass in the plain at the foot of a volcanic range, without any signs of water near us. (*Camp 98.*)

9th.—We were up before daylight, and by 6 had our breakfast, and were again on our march, visiting a water-hole seen on our outward route, but now found to be quite dry. We pushed on at the best speed of our horses, which was now not much over 2 miles an hour, to 10 h. A.M., when the heat of the day began to tell on the jaded animals; we therefore halted for an hour, to give the horses half a gallon of water each, after which they travelled on much more briskly, so that by a little past noon we succeeded in reaching the large pool in the eastern Sherlock, near Camp 55. Some of the horses were, however, so much exhausted that we had some difficulty in getting them to move for the last mile, although entirely relieved of their loads. (*Camp 55 A.*)

10th.—Although the horses were by no means in a fit state to

continue the march, yet grass was so scarce, on account of the native fires having here swept it off, that we found it best to push on for the springs at Camp 52.

Following down the banks of the stream we found several pools not yet dried up, which proved a great help to our horses. Before noon, however, the mare Lucy again gave in, and was finally abandoned, as there was but little chance of her ever reaching the Bay; it is possible she may live to be picked up by some future travellers, although too old to last many years. By 1 P.M. we reached the springs at Camp 52, and found an ample supply of water, but the grass was here also much parched up; we, however, remained for the rest of the day.

11th.—This morning our route was resumed down the eastern Sherlock, tracing a portion that had not been before examined, and which was now found to be well supplied with water and grass; cockatoos and pigeons being seen in large numbers, feeding on the banks. As we approached the junction of the two branches of the river we met a party of 10 or 12 natives, who came boldly up to us, which was the only time we had known them to do so since quitting Nickol Bay. Hoping to gain some useful information from them, they were allowed to follow us to our old camp of 2nd August, where there are the large fish-pools, of which they gave us the native names. We were not quite so successful in procuring game here as on the former visit, although as much fish was caught as could be consumed while it was good. The natives kept rather aloof while we were shooting on the river, but about dusk 8 or 10 came to the camp, unarmed, evidently on a thieving excursion; and, although narrowly watched, managed to carry off a portion of Mr. Hall's kit, which, however, he recovered next morning, on paying them an early visit, finding the articles buried under some rushes in their camp.

12th.—We were now getting so near our destination, that although provisions were running low, we could afford to give the party a whole day's rest, while I was enabled roughly to plot out some more of my work and write up the journal, which, from having my time constantly taken up with more pressing duties, had fallen sadly into arrears. The natives again came to see what they could steal, but this time were made to sit outside a line drawn on the sand, some 20 paces from the camp—an agreement they appeared highly to disapprove of, giving expression to their dissatisfaction in a manner anything but polite; finding, however, that we were inattentive to their impertinence, so long as they confined it to harmless display, they watched their opportunity, and suddenly set fire to the grass in several places at once around the camp, and ran off as hard as they could. As this was an open act of hostility that it was necessary they should be chastised for,

although I did not wish seriously to hurt them, they were allowed to run to a suitable distance, when a charge of small shot was fired after them, a few of which taking effect on the rear of the principal offender, induced him, on meeting some of the party out shooting, to make an apology, and try to lay the blame of the theft of the previous day on the dogs!

13th (*Sunday*).—As the distances between the several watering places on the homeward route were too much to perform without intermediate halts, and the heat of the noon-day sun rather oppressive, it was found better to start from the pools late in the day, so as to make the halts without water during the cool of the night, travelling only very late in the evening and early in the morning. We accordingly did not start this afternoon until 4 P.M., and travelled on to 8 h. 45 m., encamping in an open grassy plain under Black Hill—a volcanic eminence, the position of which is shown on the Admiralty charts. (*Camp 99.*)

14th.—By 6 h. we were again on the move, and in an hour gained the banks of the George, which takes its rise in the volcanic hills to the southward. In its channel was an abundant supply of water, with many fine healthy trees overshadowing the pools. By 9 we arrived at our old camp (50) where we rested to 4 h. 15 m., when we resumed and travelled on to nearly 8 P.M., encamping on the open grassy plains near the Harding River. (*Camp 100.*)

15th.—An early start enabled us to accomplish the remaining six miles to the Harding by 8 h. 30 m., where we halted for the remainder of the day, as it was not unlikely that we might have to travel the remaining 30 miles into the Bay without finding any more water. As we had now only four days' rations left, and it was uncertain, in the present low condition of our horses, how long it might take us to reach the ship, the sportsmen of the party made the best use of the halt to procure game, while I proceeded to convert some more of the empty meat-tins into water-canisters, increasing our means for the transport of water to 18 gallons, with which we had a fair prospect of getting in all the horses, even though no more water should be found on the route. Our camp was enlivened this evening by the continued screeching of a number of large bats, which kept up a vigorous fight in the trees overhead the greater part of the night, notwithstanding our shooting 10 or 12 of them. They were very fat, but emitted such an intolerable odour that it would require even an explorer to be hard pressed before he could make a supper off them, either roast or boiled.

16th.—This morning set in intensely hot, by noon the thermometer standing at 107° in the shade, and at 3 P.M., when placed on a sandbank in the sun, rose to 178° of Fahrenheit; on

the setting in of the westerly breeze it, however, fell at once to 96°, and by 4 h. 30 m. P.M. we were enabled to resume our route without feeling in any way inconvenienced by the temperature. We did not now attempt to pass through the rocky ranges so far to the eastward as on our outward route, but kept more to the westward along the open grassy valley, until opposite the narrowest part of the range, when, turning sharp to the north, we very quickly passed over the rocky portion of the hills, only encountering a few miles of extra rampant triodia, which was anything but pleasant to walk through, especially leading the party after dark. Following down a small watercourse for several miles, it at length joined the Nickol River, in which we shortly after found a small quantity of water, in the bottom of what had been a pool, but which toward the close of the dry season sometimes goes dry; here we halted for a few hours to rest. (*Camp 101.*)

17th.—Without waiting for daylight, by 2 h. 10 m. A.M. we were again on the move, as there was now a fair chance of getting all the remaining horses into the Bay, if we did but avoid travelling during the heat of the day. In an hour the hills were cleared, and it was now all open plain as far as the marsh at the head of Nickol Bay. By the time the morning broke, we were in full view of the Bay and several islands of the Archipelago, the long black hull of our ocean-home riding at anchor on the now placid waters, forming by no means the least pleasing feature of the scene, to those who had not seen a vestige of civilization for many months. After halting for nearly two hours for breakfast, and to distribute the water amongst the horses, we again moved rapidly on, crossing the marsh with some difficulty, owing to the spring-tide having been recently over it, and at 1 P.M. arrived on our old ground at Hearson Cove, where we found a boat and party from the ship waiting for us, James having been despatched by a shorter route to signalize our return. Everything had gone on satisfactorily during our absence. The vessel's water-tanks had been kept filled up, ensuring a supply for our horses on the homeward voyage, as it would be utterly impossible at this season of the year, with the animals in such low condition, to attempt the overland route to Champion Bay. Amongst other discoveries during our absence, was a bed of pearl oysters at the head of the Bay, from which the crew of the *Dolphin* had procured several tons of very fine mother-of-pearl, besides a small number of pearls, varying in size from 1 to 4 carats.

18th.—The party was fully occupied in clearing out the well and packing up saddles and outfit for shipment. It was also found that deepening the well had caused the water to become brackish, so much so that we had to bring water by boat from the spring at which the ship had been filled up; the horses however still managed

to drink the well-water, although it produced great thirst. I have no doubt but that had we had time to sink a fresh well closer to the foot of the hills, we should have obtained fresh water, as several ravines terminate there in a beautiful grassy flat, where a large proportion of the rain water brought down from the hills sinks into the soil, from whence it gradually drains down and supplies the wells in the salt strata. I was disappointed to find that the cotton plants, that had thriven so well on first being sown, had been burnt in consequence of some of the sailors having thoughtlessly set fire to the adjoining grass; had they not been killed, by this time they would probably have been in flower, as their growth was very rapid.

19th.—As it was necessary to give the horses a few days' rest previous to swimming them off to the ship, I started this morning in the life-boat, accompanied by Captain Dixon and Messrs. Brown, Harding, and Walcott, to examine the eastern shores of the bay, for the purpose of ascertaining whether a more suitable spot for a landing-place and site for a future town could be found in that quarter. Leaving the *Dolphin* at 5 h. 30 m. A.M., we ran to the eastward with a light south wind, passing, at 6 miles, two small islands in the mouth of the small bay into which the Nickol River discharges itself. These islands had been visited already by Mr. Walcott, and I gave them the name of Pemberton and Walcott Islands. Continuing to run along the shore towards Cape Lambert, the soundings gave from 2 to 3 fathoms, with a good bottom of mud and sand, but the landing was generally indifferent and rocky, until we came to within about 9 miles of the cape, when a deep opening was passed, affording good shelter and landing for small craft. Two miles farther we landed in a small rocky cove for breakfast, which gave me an opportunity of climbing a hill and examining the surrounding country, which proved very dry and rocky. A little farther we passed a bold headland, against the extremity of which rested a singular flying buttress, forming half an arch of 50 or 60 feet span, and from 30 to 40 feet in height. Turning this headland, another opening was observed, which we entered with the tide, and soon found that it communicated with the first one, forming an island of some extent and elevation, to which was given the name of Dixon Island. We continued to beat down the channel, which had an average width of over half a mile, until late in the evening, when we came to anchor in 11 feet water.

20th.—At daylight we found ourselves high and dry, only a narrow channel a few yards wide being left. Having walked over the mud to Dixon Island to breakfast, the vicinity was examined for water, but without success. At 6 the tide came in again so rapidly, that it was not without some little difficulty we gained our

boat, when the wind set in so strongly from the south-west, that after several hours' almost ineffectual attempts to work to windward, we again landed, not 2 miles from our last night's anchorage, the character of the country being equally unfavourable for landing, as it was cut up by deep mangrove creeks running far up the valleys into the steep rocky hills, forming a difficult and unpromising country. The breeze having moderated and shifted a point more to the westward, we again attempted to beat out into the bay, but by 9 P.M. had not made more than 3 miles, when we landed for the night, leaving two of the party in charge of the boat to keep her off the rocks when the tide fell.

21st.—The wind and tide being now in our favour, by 3 h. 30 m. we took to our boat and arrived on board the *Dolphin* by 10 A.M., when she was very soon got under weigh for the purpose of taking her closer in to ship the horses; light and variable winds, however, prevented our working more than a mile nearer the landing cove by sundown, when we dropped anchor for the night.

22nd.—With a light west wind the *Dolphin* was worked into 11 feet water, $1\frac{1}{2}$ mile off the point near the cove: the vessel drawing over 10 feet, brought the mud up to the surface in our wake. Eight horses were soon swam off without much difficulty, as we all had now some little experience in this sort of work.

23rd.—By 2 P.M. the remaining 6 horses and equipment of the Expedition were all safely shipped, and a conspicuous intimation of our sojourn on the coast having been painted in large white letters on a pile of granite rocks near the south corner of the cove, we took our final departure, getting the *Dolphin* under weigh by 4 P.M., with a light westerly wind, which carried us through the passage between Haüy and Delambre Islands by 7, when we hauled up and stood to N.N.W.

24th.—The wind still holding to the west, we made but little progress, the *Dolphin* being only a good sailer in smooth water, or running before the wind. Lat. $19^{\circ} 12'$ S. at noon.

25th.—By noon observations we were only in lat. $18^{\circ} 42'$, long. $113^{\circ} 32'$.

26th.—The wind veering slightly to the south, we were able to make by noon to lat. $18^{\circ} 46' 30''$, long. $111^{\circ} 47' 30''$.

27th.—From this time to the 3rd November the winds continued to blow almost uninterruptedly from the south and eastward, which carried us as far west as long. 101° E. and lat. 31° S., where we met with westerly winds, which enabled us to run up to within sight of Cape Naturaliste by the 8th.

November 9th.—By 10 A.M. we were off Rottneest Island, when the pilot came on board and took us to the anchorage in Gage's Roads by about noon. Having given instructions to Mr. Turner for the landing of the horses, &c., I landed with Messrs. Brown,

Harding, and Hall, all of whom were, at their desire, at once released from the duties of the Expedition. Proceeded by steamer to Perth.

10th.—Had an interview with his Excellency the Governor, and reported the safe return of the party and general results of the Expedition.

F. T. GREGORY,

Commander N.W. Australian Expedition.

APPENDIX.

ADOPTING the course which I have found most convenient on similar occasions, I now proceed to offer a few remarks on the general features, productions, natural capabilities, &c., of the country traversed by the Expedition, which could not, without disadvantage, have been introduced into the foregoing narrative. These remarks have already appeared at the conclusion of my Report published on the 18th November, 1861, but are equally applicable to the present publication.

Commencing with its geographical and geological peculiarities, that portion of the country which came under our observation consists of a succession of terraces, rising inland for nearly 200 miles, more or less broken up by volcanic hills towards the coast. The first belt averages from 10 to 40 miles in width from the sea, and is a nearly level plain, slightly ascending to the southward, with an elevation of from 40 to 100 feet, the soil being generally either light loam or strong clays, according as it is the result of the disintegration of the granite rocks that occasionally protrude above its surface, or of volcanic rocks of black scoria that frequently interrupt the general level; hills of this nature also constitute the greater portion of the more elevated islands off the coast, Cape Lambert, and the promontory that shelters the western side of Nickol Bay. The generality of these rocks do not, however, yield so rich a soil as might be expected from their origin; this is owing to the absence of actual lava, the eruptive heat having only been sufficient to convert the superincumbent primary and tertiary rocks into a vitreous scoria, having a specific gravity of 3.2, and is highly indestructible in its texture.

Proceeding inland for the next 50 or 60 miles is a granite country that has been originally capped with horizontal sandstones, and has an elevation of about 1000 feet. This range terminates to the southward in level plains of good soil, the produce of the next series of more elevated country, while towards the northern edges the granite and sandstones have undergone great changes through the action of numerous trap dykes that have greatly disturbed its surface, producing metamorphic rocks, some resembling jasper, and others highly cellular and scoriaceous.

In about lat. 22°, on the meridian of Nickol Bay, we came upon another and more elevated range, trending away to the s.e., having an altitude of 2500 feet above the sea. This, unlike the last section, has a southern escarpment of 500 or 600 feet, and consists of horizontal sandstones and conglomerates, which have comparatively undergone little change, and has an average breadth of 8 or 10 miles; the southern flank being bordered by fertile valleys of strong loamy clays, merging gradually to the southward into stony ridges and hills, some having an elevation of nearly 4000 feet, the culminating point being attained at Mount Bruce, in lat. 22° 30'.

From this point the country gradually falls to the Ashburton, the bed of which river, in the same meridian as the bay, is about 1600 feet above the sea,

and the adjoining ranges not above 2200 feet, or about the same as the country on the Gascoyne, Lyons, and Upper Murchison.

Of minerals I was unable to discover any traces, except iron. Quartz-reefs occasionally traversed the country in a N.N.E. and S.S.W. direction, or nearly the same as the mineral lodes at Champion Bay, but I could not find any instance in which this rock offered much to indicate the probable existence of gold, it being far surpassed in this respect by the rocks on the Upper Murchison. Coal does not appear likely to be found within the limits of the country passed over, unless towards the easternmost point attained by the Expedition.

With regard to the harbours on the coast, I can only speak of Nickol Bay and the anchorage under Rosemary and the adjacent islands. The former I consider only second to King George's Sound, as it can be entered in all weathers, either from the north or north-east; and there is reason to believe that a safe passage exists between Legendre and Dolphin Islands, leading into Mermaid Straits, where there appears to be an excellent harbour at all seasons of the year.

The soundings towards the eastern and western shores of Nickol Bay, taken at low water, show sufficient depth for vessels of considerable tonnage to lie within a cable's length of the shore, the bottom being fine sand and soft mud. Towards the head of the bay the water is much shallower, not carrying more than 2 fathoms, 2 miles from the shore. No reefs are known to exist in this bay, except quite close in to land.

In making the running survey of the western promontory I found that all to the north of Sloping Head was an island, having a boat channel, from half a mile to a mile wide; to the outer portion I therefore gave the name of Dolphin Island.

The tides are tolerably regular, and average 16 feet, but at the spring they rise 21 feet; on which occasions the whole of the western promontory, including the high lands for several miles to the westward, is entirely cut off by the sea, the other opening being under Enderby Island—a circumstance that greatly detracts from the value of these otherwise fine harbours, as it would require 2 miles of causeway to connect the best landing-place, where water is to be found, with the mainland.

The average declination of the needle throughout this district I found to be 1° east, the result of many amplitudes and azimuths; there is, however, in the vicinity of many of the volcanic hills, great local attraction.

Of the climate I can only say that during the five months we remained on the coast we never experienced the same inconvenience from it that we frequently have done within the limits of the settled districts of the colony; the weather was, however, principally fine, and the sky clear during our stay, only two showers having occurred—one at the latter end of May and the other in June. The meteorological register kept at Nickol Bay shows the following results, from observations taken at all hours of the day and night:—

				Thermometer.	
				Maximum.	Minimum.
May	..	..	..	80	65
June	..	..	..	76	63
July	..	..	..	78	56
August	..	..	..	80	54
September	..	..	..	83	65
October	..	..	..	92	70

Under the peculiar circumstance of the thermometer being placed on a sand-bank in the sun during the hot days in October, it rose to 178° of Fahrenheit, whilst the lowest it ever fell to was up in the hills in July, when it was 2° below freezing just before sunrise.

The winds continued to blow almost uninterruptedly from the E. and S.E.

during the first four months, veering to the S.E. and S., and occasionally to the N.E. Latterly the wind was alternately S.E. in the morning, and N.W. or westerly in the afternoon; the sky becoming frequently overcast, and every appearance of the near approach of the rainy season, which it has been observed by former navigators and explorers to do about the beginning of November, and continue to March.

Amongst the natural productions I would first briefly refer to the beds of the pearl oysters, as they are likely to become of immediate commercial importance, considerable numbers having been gathered by the crew of the *Dolphin* in their leisure time, the aggregate value of which, I am told, is between 500*l.* and 600*l.*; besides pearls, one of which has been valued by competent persons at 25*l.* The limits of the bed are as yet undefined, but there is good reason to believe, from the position of it, that with proper apparatus ships could soon be loaded with them.

Sandalwood was found in small quantities, very highly scented, but too widely scattered to become of much importance as an article of export.

Of indigenous fruits, &c., we observed the *Adansonia*, or gouty-stemmed tree of Sir G. Grey (nearly allied to the baobab or monkey bread-fruit of Southern Africa). Sweet and water-melons, similar to those formerly seen by me on the Lyons River, but of much larger size; a small gourd; a wild fig, well tasted, and a sweet plum, very palatable, were found in tolerable abundance.

I have already spoken of the palms which grow on the bank of the Fortescue; they are very handsome, and grow to the height of 40 feet; but not having brought in any specimens, they have not yet been identified as to their variety.

Tobacco does not grow so luxuriantly here as on the Lyons River, but the natives collect it, and, after preparation, chew it: we did not on any occasion observe them to smoke.

Many beautiful flowers were also collected, which will be forwarded to some of the most eminent botanists, to be described and classified.

It now only remains for me to give an opinion on the capabilities of the country for colonization. It would be almost impossible to particularise the positions or define the limits of country adapted for grazing purposes, beyond the reference already made to them. The total amount of land available for this purpose within the limit of our route I should estimate at not less than two or three millions of acres, and of this I may safely say 200,000 are suitable for agricultural purposes, the greater portion of which lies on the two flanks of the Hamersley Range, on the banks of the DeGrey and its tributaries, and on the Lower Sherlock.

Of the fitness of this district for the growth of wool, for which, on account of its being an intertropical country, it is generally supposed it would be unsuitable, I would remark that its elevation above the sea appears likely to obviate the objection, and render it probable that sheep may not degenerate in the same way they are found to do in other tropical countries; at any rate, flocks are now being pushed over on to the same latitude in Queensland, and we do not hear of the wool-growers complaining that such is the case there.

As to its fitness for the growth of cereals, it is quite possible that wheat and barley may not come to the same degree of perfection they do in the more temperate latitudes of Australia, but there is no reason to doubt its capability of growing sufficient grain for the support of a numerous population.

What it appears more highly qualified for than anything else is the growth of cotton—a question which at the present juncture cannot be lost sight of. From my personal observation of the cultivation of this plant in Egypt, and the attention I have recently paid to this subject while in Europe, I feel confident that a very considerable portion of the arable lands on the DeGrey and Sherlock are precisely the soils adapted for the production of this valuable com-

modity. As, however, I purpose to make this the subject of a more lengthy paper at a future period, I will not now venture to enlarge upon it.

As the number and disposition of the aborigines are likely to have some effect on the first settlement of a district, I would give it as my opinion that these people will not prove particularly troublesome to the settlers, if properly and fairly treated. They are not numerous; they appear very willing to take employ under Europeans, and will no doubt soon be made as useful as in the other districts. In stature they rather exceed the usual standard, some of them measuring two or three inches over six feet.

In bringing my Report to a close, I would wish to observe that, although the results of the Expedition have fallen short of my sanguine hopes with regard to geographical discovery, and will, I am afraid, in some degree disappoint the anticipations of the eminent geographers who have lent their valuable aid in promoting the undertaking, yet I cannot but hope that the large amount of additional fertile country it has brought to our knowledge will compensate in some degree for the deficiency. I am, however, unable to refrain from again expressing my opinion that had not so many concurrent circumstances combined to retard the departure of the Expedition until so late in the season, and if it had arrived on the coast at the time originally recommended by the Geographical Society, it would, in all probability, have resulted in the full accomplishment of the object they had in view.

It now devolves upon me to perform the pleasing duty of recording my entire satisfaction with the manner in which the whole of the members of the Expedition put forward their best energies in the performance of their respective functions. To Mr. Turner I am indebted for the care bestowed on the management of the store department, which came under his immediate charge. To Messrs. Brockman and Hall, J. M'Court, and James, are due my acknowledgments for the cheerful alacrity with which they performed the duties allotted to them.

Of Messrs. Maitland Brown and J. Harding I cannot speak too highly. Accompanying me on all the extra services upon which I was engaged, they had to endure privations of no ordinary description, which they met with a spirit of steady fortitude deserving of the highest praise. To the valuable services rendered to the Expedition and to science by Mr. P. Walcott I have already had occasion to refer, and I sincerely hope that his talents and zeal in the pursuits of Botany and Natural History may meet a more substantial reward than the thanks which are justly due to him and those gentlemen who have given their time and talents gratuitously in the service of their fellow-colonists.

To Captain Dixon and the officers and crew of the *Dolphin* every praise is due for the assistance which on all occasions they promptly afforded in aiding the Expedition, and for which I gladly avail myself of the present opportunity to return them my best thanks.

In conclusion, permit me to tender your Excellency my acknowledgments for the readiness with which you have acceded to my various suggestions, in carrying out the arrangements of the Expedition since the passing of the vote of money in aid by the local Legislature.

F. T. G.

XXVI.—*Exploring Expedition from Victoria to the Gulf of Carpentaria, under the Command of Mr. ROBERT O'HARA BURKE.*

Communicated by the COLONIAL OFFICE.

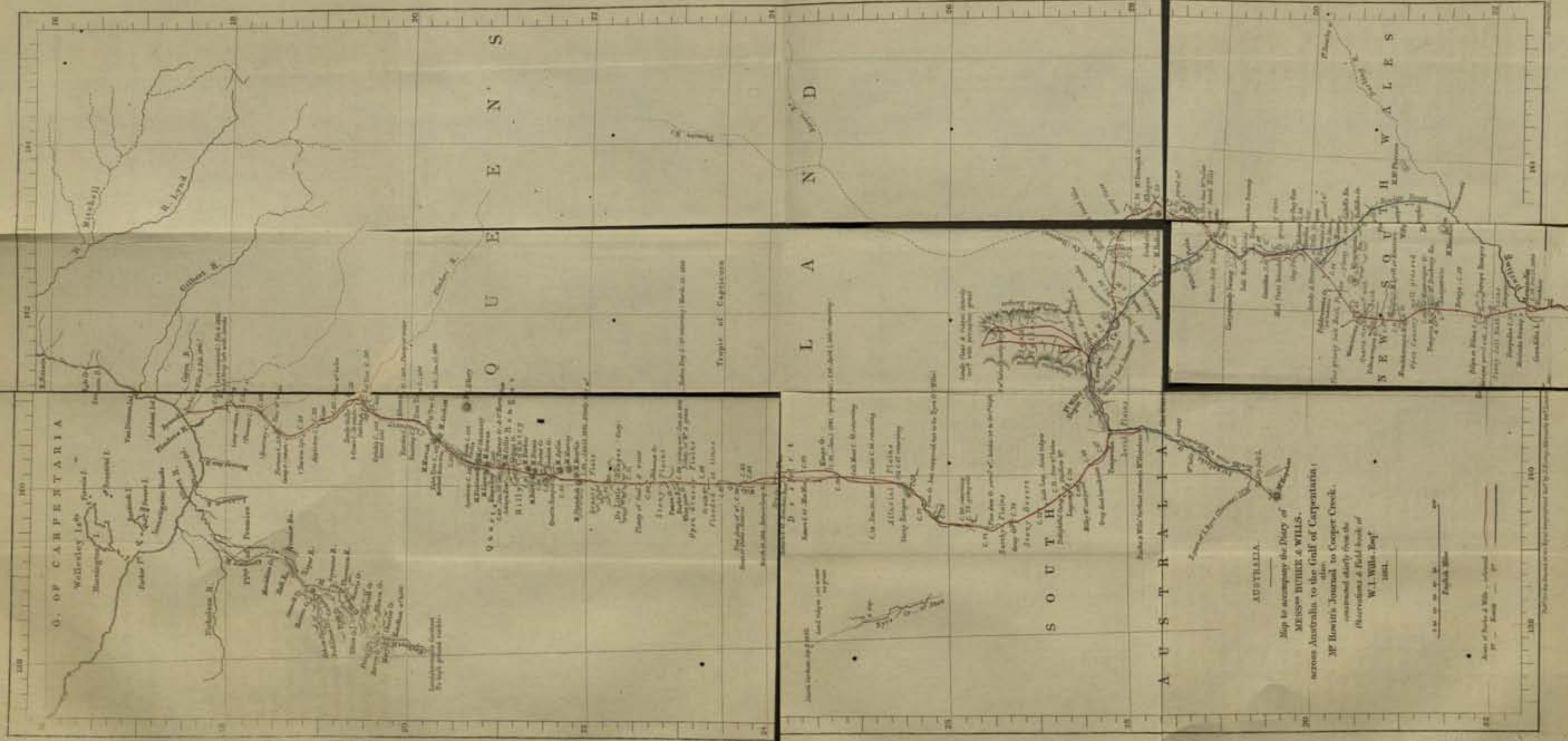
*Containing Journals of HOWITT, KING, WILLS, BURKE, WRIGHT, and BRAHÉ.**

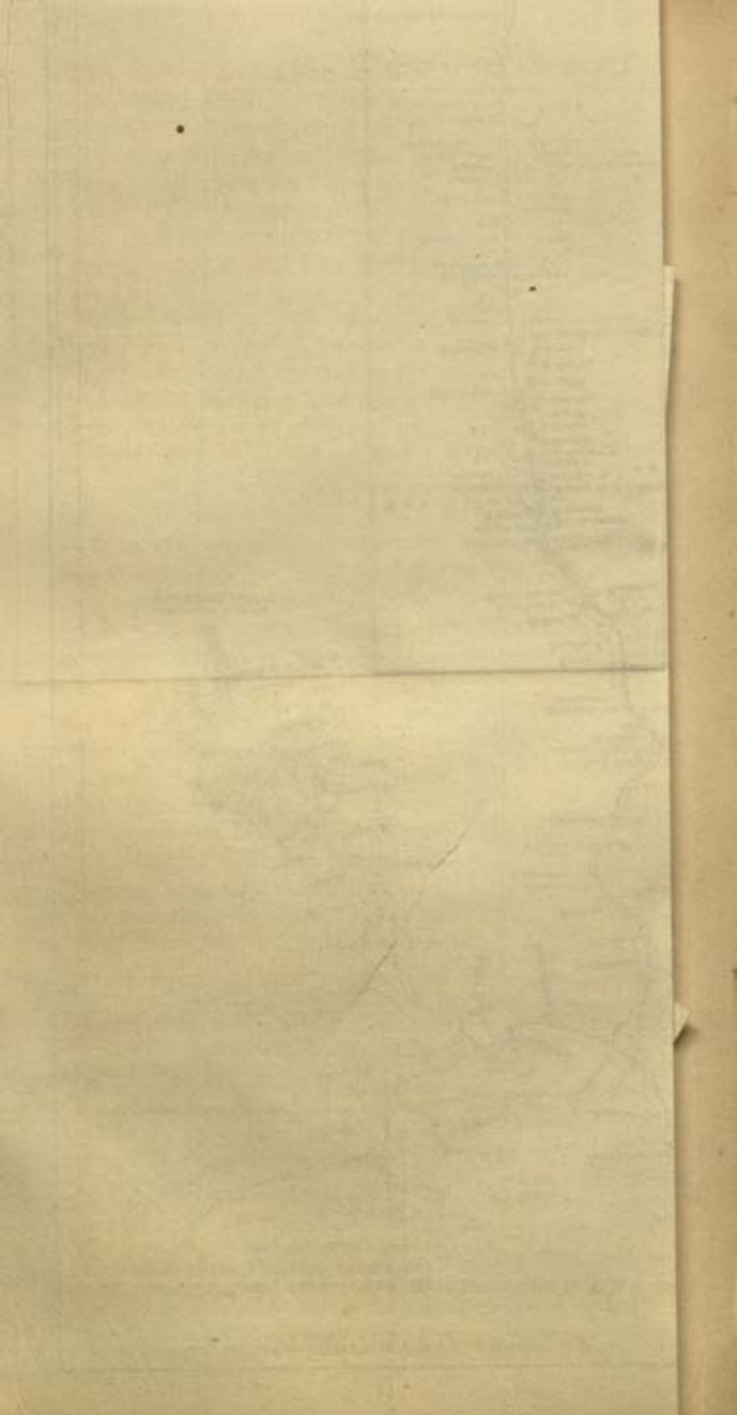
Mr. A. W. HOWITT's Despatch.

Poria Creek, Oct. 10, 1861.

SIR,—I have the honour to report my arrival here with the Contingent Exploring Party, on my return journey, having on September 15, in lat. $27^{\circ} 44'$, and long. $140^{\circ} 40'$, found John King, the only survivor of Mr. Burke's party, living with the Cooper's Creek natives. Mr. Burke and Mr. Wills had died some time previous to my arrival, from hunger and exhaustion, and Gray died before reaching Cooper's Creek, on their return journey from the Gulf. King was in a very weak, exhausted state when found, but I am happy to say has recovered wonderfully since, and Mr. Wheeler has just reported him to me as being out of his hands. The full particulars will be found in my diary, which, with King's narrative, is enclosed. I may state regarding my diary, that I have only transcribed that portion subsequent to our reaching this place on our outward journey, as up to that time we had followed the Expedition track, and nothing of interest had occurred. It may suffice for me to state that from leaving Menindie we had travelled without meeting with any particular hindrances, finding splendid feed almost the whole way, and sufficient water for our use, with the exception of three nights, when our horses were without. The rain had been very partial, and in places we only found sufficient for our immediate use. Torowoto and Carriapundy swamps and the mud-plains were perfectly dry, and no water that could long be relied on, without subsequent rain, from Nuntherunga back to this place, a distance of about 180 miles. I had intended leaving the Expedition track at Carriapundy, but was deterred from doing so by the very dry appearance of the country; and, therefore, followed the track to this creek, which is permanent. I am happy to be able to state that the party are and have been in

* Despatches were received in Melbourne late on Saturday, 2nd November, from Mr. Howitt, the leader of the Victorian Contingent Exploration Party, containing the disastrous intelligence that, after successfully crossing the Australian continent, Messrs. Burke and Wills had died of starvation in the neighbourhood of Cooper's Creek, and Gray a short time before Cooper's Creek was reached; King being the only member of the party who survived, and who was rescued by the Contingent party.





perfect health, and that the horses are in excellent working order. The camels are, on the whole, in as good condition as when they left Menindie, and may be pronounced cured of the scab, which I cannot help attributing in a great measure to the bad management of the sepoy. So far I have met with no loss or accident of any kind, and the natives, wherever I have seen them, have been friendly. I expect to be down at Menindie in three weeks, and may probably spend two or three days at Torowoto to endeavour to find permanent water, as I know of none there that can be relied on. I forward these despatches by Mr. Brahé and Weston Phillips, with four of our best horses. I consider that they will have no particular difficulties in going down, excepting as regards water, which would not be lessened by a larger party, and I cannot well spare more men, from the number of camels and pack-horses to look after. Should there be horses at Menindie fit for the journey down, I have instructed Mr. Brahé to proceed at once to town, taking with him the documents and field-books belonging to Mr. Burke and Mr. Wills, and relating to the journey to and from the Gulf. King I shall send down on my arrival at the Darling.

I beg to urge on the committee the necessity of sending me immediate instructions to Menindie respecting the further disposal of the party and equipment.

I have the honour to be, Sir, your most obedient servant,

A. W. HOWITT,

Leader of the Contingent Exploring Party.

To the Hon. JOHN MACADAM, M.D.,

Hon. Secretary to the Exploration Committee, Melbourne.

JOHN KING'S *Narrative.*

Mr. Burke, Mr. Wills, and I, reached the dépôt at Cooper's Creek on April 21st, about half-past seven in the evening, with two camels—all that remained of the six Mr. Burke took with him. All the provisions we then had, consisted of a pound and a half of dried meat. We found the party had gone the same day, and looking about for any mark they might have left, found the tree with DIG, April 21. Mr. Wills said the party had left for the Darling. We dug, and found the plant of stores. Mr. Burke took the papers out of the bottle, and then asked each of us whether we were able to proceed up the creek in pursuit of the party? We said not; and he then said that he thought it his duty to ask us, but that he himself was unable to do so: but that he had decided upon trying to make Mount Hopeless, as he had been assured by the committee in Melbourne that there was a cattle-station within 150 miles of Cooper's Creek. Mr. Wills was

not inclined to follow this plan, wishing to go down our old track, but at last gave in to Mr. Burke's wishes; I also wished to go down by our old track. We remained four or five days to recruit, and make preparations to go down the creek by stages of four to five miles a day, and Mr. Burke placed a paper in the plant, stating what were our plans. Travelling down the creek, we got some fish from the natives, and, some distance down, one of the camels (Landa) got bogged, and although we remained there that day and part of the next trying to dig him out, we found our strength insufficient to do so. The evening of the second day we shot him as he lay, and having cut off as much meat as we could, we lived on it while we stayed to dry the remainder. Throwing all the least necessary things away, we made one load for the remaining camel (Rajah), and each of us carried a swag of about 25 lbs. We were then tracing down the branches of the creek running south, but found that they ran out into earthy plains. We had understood that the creek along Gregory's track was continuous; and finding that all these creeks ran out into plains, Mr. Burke returned, our camel being completely knocked up. We then intended to give the camel a spell for a few days, and to make a new attempt to push on forty or fifty miles to the south, in the hope of striking the creek. During the time that the camel was being rested, Mr. Burke and Mr. Wills went in search of the natives, to endeavour to find out how the nardoo grew. Having found their camp, they obtained as much nardoo-cake and fish as they could eat, but could not explain that they wished to be shown how to find the seed themselves. They returned on the third day, bringing some fish and nardoo-cake with them. On the following day the camel Rajah seemed very ill: I told Mr. Burke I thought he could not linger out more than four days; and as on the same evening the poor brute was on the point of dying, Mr. Burke ordered him to be shot. I did so, and we cut him up with two broken knives and a lancet. We cured the meat and planted it; and Mr. Burke then made another attempt to find the nardoo, taking me with him. We went down the creek, expecting to find the natives at the camp where they had been last seen, but found that they had left; and, not knowing whether they had gone up or down the creek, we slept in their gunyahs that night, and on the following morning returned to Mr. Wills. The next day Mr. Burke and I started up the creek, but could see nothing of them, and were three days away when we returned, and remained three days in our camp with Mr. Wills. We then made a plant of all the articles we could not carry with us, leaving 5 lbs. of rice and a quantity of meat, and then followed up the creek, where there were some good native huts. We remained at that place a few days, and, finding our provisions were

beginning to run short, Mr. Burke said that we ought to do something, that if we did not find the nardoo we should starve, and that he intended to save a little dried meat and rice to carry us to Mount Hopeless. The three of us then came to the conclusion that it would be better to make a second attempt to reach Mount Hopeless, as we were then as strong as we were likely to be, our daily allowance being then reduced. Mr. Burke asked each of us whether we were willing to make another attempt to reach the South Australian settlements, and we decided on going. We took with us what remained of the provisions we had planted—two-and-a-half pounds of oatmeal, a small quantity of flour, and the dried meat: this, with powder and shot, and other small articles, made up our swags to 30 lbs. each, and Mr. Burke carried one billy of water, and I another. We had not gone far before we came on a flat, where I saw a plant growing which I took to be clover, and, on looking closer, saw the seed, and called out that I had found the nardoo. They were very glad when I found it. We travelled three days, and struck a watercourse coming south from Cooper's Creek. We traced this, as it branched out and re-formed on the plains, until we at last lost it in flat country. Sandhills were in front of us, for which we made, and travelled all day, but found no water. We were all greatly fatigued, as our rations now consisted of only one small johnny cake and three sticks of dried meat daily. We camped that evening about four o'clock, intending to push next day until two o'clock, P.M., and then should we not find water, to return. We travelled, and found no water, and the three of us sat down and rested for an hour, and then turned back. We all felt satisfied that, had there been a few days' rain, we could have got through. We were then, according to Mr. Wills's calculation, forty-five miles from the creek. We travelled on the day we turned back very late, and the following evening reached the nearest water at the creek. We gathered some nardoo, and boiled the seeds, as we were unable to pound them. The following day we reached the main creek; and knowing where there was a fine water-hole and native gunyahs, we went there, intending to save what remained of our flour and dried meat, for the purpose of making another attempt to reach Mount Hopeless. On the following day Mr. Wills and I went out to gather nardoo, of which we obtained a supply sufficient for three days; and finding a pounding-stone at the gunyahs, Mr. Wills and I pounded the seed, which was such slow work that we were compelled to use half flour and half nardoo. Mr. Burke and Mr. Wills then went down the creek for the remainder of the dried meat which we had planted, and we had now all our things with us, gathering nardoo, and living the best way we could. Mr. Burke requested Mr. Wills to go up the creek as far as the dépôt,

and to place a note in the plant there, stating that we were then living on the creek, the former note having stated that we were on our road to South Australia. He was also to bury there the field-books of the journey to the Gulf. Before starting he got 3 lbs. of flour and 3 lbs. of pounded nardoo, and about a pound of meat, as he expected to be absent about eight days. During his absence I gathered nardoo and pounded it, as Mr. Burke wished to lay in a supply in case of rain.

A few days after Mr. Wills left, some natives came down to the creek to fish at some water-holes near our camp. They were civil to us at first, and offered us some fish; on the second day they came again to fish, and Mr. Burke took down two bags, which they filled for him; on the third they gave us one bag of fish, and afterwards all came to our camp. We used to keep our ammunition and other articles in one gunyah, and all three of us lived together in another. One of the natives took an oilcloth out of this gunyah, and Mr. Burke, seeing him run away with it, followed him with his revolver and fired over his head, and upon this the native dropped the oilcloth. While he was away, the other blacks invited me to a water-hole to eat fish; but I declined to do so, as Mr. Burke was away, and a number of natives were about who would have taken all our things. When I refused, one took his boomerang and laid it over my shoulder, and then told me by signs that if I called out for Mr. Burke, as I was doing, that he would strike me. Upon this I got them all in front of the gunyah and fired a revolver over their heads, but they did not seem at all afraid, until I got out the gun, when they all ran away. Mr. Burke, hearing the report, came back, and we saw no more of them until late that night, when they came with some cooked fish and called out "white fellow." Mr. Burke then went out with his revolver, and found a whole tribe coming down, all painted, and with fish in small nets carried by two men. Mr. Burke went to meet them, and they wished to surround him; but he knocked as many of the nets of fish out of their hands as he could, and shouted out to me to fire. I did so, and they ran off. We collected five small nets of cooked fish. The reason he would not accept the fish from them was that he was afraid of being too friendly, lest they should be always at our camp. We then lived on fish until Mr. Wills returned. He told us that he had met the natives soon after leaving us, and that they were very kind to him and had given him plenty to eat both on going up and returning. He seemed to consider that he should have very little difficulty in living with them; and, as our camp was close to theirs, he returned to them the same day and found them very hospitable and friendly, keeping him with them two days. They then made signs to him to be off. He came to us and narrated what had happened, but

went back to them the following day, when they gave him his breakfast, but made signs to him to go away. He pretended not to understand them, and would not go; upon which they made signs that they were going up the creek, and that he had better go down. They packed up and left the camp, giving Mr. Wills a little nardoo to take to us.

During his absence, while Mr. Burke was cooking some fish, during a strong wind, the flames caught the gunyah, and burned so rapidly that we were unable, not only to put it out, but to save any of our things, excepting one revolver and a gun. Mr. Wills being returned, it was decided to go up the creek and live with the natives, if possible, as Mr. Wills thought we should have but little difficulty in obtaining provisions from them if we camped on the opposite side of the creek to them. He said he knew where they were gone, so we packed up and started. Coming to the gunyahs where we expected to have found them, we were disappointed; and seeing a nardoo field close by, halted, intending to make it our camp. For some time we were employed gathering nardoo, and laying up a supply. Mr. Wills and I used to collect and carry home a bag each day, and Mr. Burke generally pounded sufficient for our dinner during our absence; but Mr. Wills found himself getting very weak, and was shortly unable to go out and gather nardoo as before, nor even strong enough to pound it, so that in a few days he became almost helpless. I still continued gathering; and Mr. Burke now also began to feel very weak, and said he could be of very little use in pounding. I had now to gather and pound for all three of us. I continued to do this for a few days; but finding my strength rapidly failing, my legs being very weak and painful, I was unable to go out for several days, and we were compelled to consume six days' stock, which we had laid by. Mr. Burke now proposed that I should gather as much as possible in three days, and that with this supply we should go in search of the natives—a plan which had been urged upon us by Mr. Wills as the only chance of saving him and ourselves as well, as he clearly saw that I was no longer able to collect sufficient for our wants. Having collected the seed, as proposed, and having pounded sufficient to last Mr. Wills for eight days, and two days for ourselves, we placed water and firewood within his reach, and started. Before leaving him, however, Mr. Burke asked him whether he still wished it, as under no other circumstances would he leave him; and Mr. Wills again said that he looked on it as our only chance. He then gave Mr. Burke a letter and his watch for his father, and we buried the remainder of his field-books near the gunyah. Mr. Wills said that, in case of my surviving Mr. Burke, he hoped that I would carry out his last wishes in giving the watch and letter to his father.

In travelling the first day Mr. Burke seemed very weak, and complained of great pain in his legs and back. On the second day he seemed to be better, and said that he thought he was getting stronger, but, on starting, did not go two miles before he said he could go no farther. I persisted in his trying to go on, and managed to get him along several times, until I saw that he was almost knocked up; when he said he could not carry his swag, and threw all he had away. I also reduced mine, taking nothing but a gun and some powder and shot, and a small pouch and some matches. On starting again, we did not go far before Mr. Burke said he should halt for the night; but as the place was close to a large sheet of water, and exposed to the wind, I prevailed on him to go a little farther, to the next reach of water, where we camped. We searched about, and found a few small patches of nardoo, which I collected and pounded, and, with a crow which I shot, made a good evening's meal. From the time we halted Mr. Burke seemed to be getting worse, although he ate his supper. He said he felt convinced he could not last many hours, and gave me his watch, which he said belonged to the committee, and a pocket-book to give to Sir William Stawell, and in which he wrote some notes. He then said to me, "I hope you will remain with me here till I am quite dead—it is a comfort to know that some one is by; but, when I am dying, it is my wish that you should place the pistol in my right hand, and that you leave me unburied as I lie." That night he spoke very little, and the following morning I found him speechless, or nearly so; and about eight o'clock he expired. I remained a few hours there; but as I saw there was no use in remaining longer, I went up the creek in search of the natives. I felt very lonely, and at night usually slept in deserted wurleys, belonging to the natives. Two days after leaving the spot where Mr. Burke died, I found some gunyahs, where the natives had deposited a bag of nardoo, sufficient to last me a fortnight, and three bundles containing various articles. I also shot a crow that evening, but was in very great dread that the natives would come and deprive me of the nardoo.

I remained there two days to recover my strength, and then returned to Mr. Wills. I took back three crows; but found him lying dead in his gunyah, and the natives had been there and had taken away some of his clothes. I buried the corpse with sand, and remained there some days. But finding that my stock of nardoo was running short, and being unable to gather it, I tracked the natives who had been to the camp, by their footprints in the sand; and, when some distance down the creek, shooting crows and hawks on the road, the natives, hearing the report of the gun, came to meet me, and took me with them to their camp, giving me nardoo and fish. They took the birds I had shot and cooked

them for me, and afterwards showed me a gunyah, where I was to sleep with three of the single men. The following morning they commenced talking to me, and putting one finger on the ground, and covering it with sand, at the same time pointing up the creek, saying "White fellow," which I understood to mean that one white man was dead. From this, I thought they were the tribe who had taken Mr. Wills's clothes. They then asked me where the third man was, and I also made the sign of putting the fingers on the ground, and covering them with sand, at the same time pointing up the creek. They appeared to feel great compassion for me when they understood that I was alone on the creek, and gave me plenty to eat. After being four days with them, I saw that they were becoming tired of me, and they made signs that they were going up the creek, and that I had better go downwards; but I pretended not to understand them. The same day they shifted camp, and I followed them; and, on reaching their camp, I shot some crows, which pleased them so much that they made me a breakwind in the centre of their camp, and came and sat round me until such time as the crows were cooked, when they assisted me to eat them. The same day, one of the women, to whom I had given part of a crow, came and gave me a ball of nardoo, saying that she would give me more only she had such a sore arm that she was unable to pound. She showed me a sore on her arm, and the thought struck me that I would boil some water in the billy and wash her arm with a sponge. During the operation the whole tribe sat round, and were muttering one to another. Her husband sat down by her side, and she was crying all the time. After I had washed it, I touched it with some nitrate of silver, when she began to yell and ran off, crying "Mokow! mokow!" (Fire! fire!) From this time she and her husband used to give me a small quantity of nardoo both night and morning, and whenever the tribe was about going on a fishing excursion, he used to give me notice to go with them. They also used to assist me in making a wurley, or breakwind, whenever they shifted camp. I generally shot a crow, or a hawk, and gave it to them in return for these little services. Every four or five days the tribe would surround me and ask whether I intended going up or down the creek; at last I made them understand that if they went up I should go up the creek, and if they went down I should also go down, and from this time they seemed to look upon me as one of themselves, and supplied me with fish and nardoo regularly. They were very anxious, however, to know where Mr. Burke lay, and one day when we were fishing in the water-holes close by, I took them to the spot. On seeing his remains the whole party wept bitterly, and covered them with bushes. After this they were much kinder to me than before, and I always told them

that the white men would be here before two moons, and in the evenings, when they came with nardoo and fish, they used to talk about the "white fellows" coming, at the same time pointing to the moon. I also told them they would receive many presents, and they constantly asked me for tomahawks, called by them "bomay ho." From this time to when the relief party arrived—a period of about a month—they treated me with uniform kindness, and looked upon me as one of themselves. The day on which I was released, one of the tribe who had been fishing came and told me that the white fellows were coming; and the whole of the tribe, who were then in camp, sallied out in every direction to meet the party, while the man who had brought the news took me over the creek, where I shortly saw the party coming down.

BRAHÉ'S *Letter*.

The following is the letter deposited by Mr. Brahé in the *câche* at Cooper's Creek on the 21st of April, when he left that for Menindie:—

Depôt, Cooper's Creek, April 21st, 1861.

The depôt party of V. E. E. leaves this camp to-day, to return to the Darling. I intend to go south-east from Camp 60, to get into our old track near Bulloo. Two of my companions and myself are quite well; the third—Patton—has been unable to walk for the last eighteen days, as his leg has been severely hurt when thrown by one of the horses. No person has been up here from the Darling.

We have six camels and twelve horses in good working condition.

WILLIAM BRAHÉ.

BURKE'S *Last Letter*.

The following is the despatch of Mr. Burke, left at the Depôt at Cooper's Creek:—

Depôt No. 2, Cooper's Creek. Camp No. 65.
22nd April, 1861.

The return party from Carpentaria, consisting of myself, Mr. Wills, and King (Gray dead), arrived here last night, and found that the depôt party had only started on the same day. We proceed to-morrow slowly down the creek towards Adelaide, by Mount Hopeless, and shall endeavour to follow Gregory's track, but we are very weak. The two camels are done up, and we shall not be able to travel farther than four or five miles a day. Gray died on the road from exhaustion and fatigue. We have all suffered much from hunger. The provisions left here will, I think, restore our strength. We have discovered a practicable route to

Carpentaria, the chief portion of which lies on the 140th meridian of east longitude. There is some good country between this and the stony desert. From there to the tropic the country is dry and stony. Between the tropic and Carpentaria a considerable portion is rangy, but it is well watered and richly grassed.

We reached the shores of Carpentaria on the 11th February, 1861. Greatly disappointed at finding the party here gone.

R. O'HARA BURKE, Leader.

P.S. The camels cannot travel, and we cannot walk, or we should follow the other party. We shall move very slowly down the creek.

WILLS's Last Letter.

The following is Mr. Wills's letter, which he buried in the *câche* at Cooper's Creek, after finding it impossible to get through to South Australia :—

Depôt Camp, 30th May.

We have been unable to leave the creek. Both camels are dead, and our provisions are done. Mr. Burke and King are down the lower part of the creek. I am about to return to them, when we shall probably come up this way. We are trying to live the best way we can, like the blacks, but find it hard work. Our clothes are going to pieces fast. Send provisions and clothes as soon as possible.

W. J. WILLS.

The depôt party having left, contrary to instructions, has put us in this fix. I have deposited some of my journals here, for fear of accidents.

(Signed)

W. J. W.

HOWITT's Diary.

September 1. Camp 20, Poria Creek; lat. 28° 44', long. 142° 42'. —The country, after leaving Camp 19 (Koorlegur), was generally sandy ridges, running variously from north-east round to north-west. Between these sandy tracts we passed a good deal of clayey flat ground—in places hard and smooth, in others spongy and rotten, and cracked deeply by the heat; polygonum and cane-grass growing in great quantities. The feed everywhere poor and scanty, and very dry. I believe that very little rain has fallen here this season. After about ten miles, the sand-ridges became more marked, and of a red colour, and the flats wide, and draining to the north-east. Scattered box-trees began to appear, and birds were more numerous. At five miles more, struck Poria Creek, a

deep channel coming from a northerly direction, and containing abundance of water: its general width appears to be about 60 feet, and the banks are lined with small box-trees; water-plants and a species of water-moss grow in the bed, and, from fish and crayfish being found in it, I have no doubt that it is permanent—in fact, the only water I can consider such of all these we have seen on this side the Daubeny Ranges. At a distance of about half a mile, the course of the creek is followed by high red sand-ridges, running parallel to its course. There is no timber anywhere but on the creek, and only small bushes and one or two kinds of pittosporum and mulgar on the sand-ridges. The country is very inferior in every respect, but water as we proceed. Signal-fires in two places as we were travelling; both very large, and no doubt intended to announce our arrival. On some of the flats I observed quantities of the plant growing from the seeds of which the natives make their bread. It appears to choose a loose blistered clayey soil, subject to be flooded, such as is generally found in polygonum ground. The leaves resemble clover, but with a silvery down, which is also found on the seed when fresh; these grow on short stems springing from the roots, and are flat and rather oval: in places where the plant has died down, these seeds quite cover the ground; they are gathered by the native women, and, after being cleaned from the sand, are pounded between two stones and baked as cakes.

Sept. 2. Camp 20.—Spelled here to-day before starting across for Cooper's Creek. Mending pack-bags, dressing camels, baking four days' bread, &c. Day warm; wind from south-east, which seems to be the prevalent quarter. Flies begin to be troublesome.

Sept. 3. Camp 21, lat. $28^{\circ} 22'$, long. $142^{\circ} 31'$.—Started at eight o'clock, and left the expedition track at Poria Creek. Struck a course for Cooper's Creek north-west by compass. For seven miles travelled over sand-ridges running north-east and south-west, with wide clayey valleys between, in which were occasional small pools of muddy water. The feed everywhere very dry, but tolerably plentiful on the sandhills. Bushes and small mulgar-trees were growing in places. We here crossed a dry box-swamp, where crows, wood-swallows, kites, and small birds were numerous; and I observed here several trees with a rough bark resembling cork, and with bunches of long, pointed, dark green leaves growing at the ends of the small branches. The sandhills here became low and flat, and the valley wider. Shortly afterwards crossed the track of a large camel going north-east, apparently about eight months ago. The country undulating and well grassed, and, as far as I could make out, the watershed both to the north-east and south-west. At twelve o'clock, after crossing a dry swamp full of watercourses, and passing a low sandhill, came on a creek running

south-west, thickly timbered with large box-trees, the bed wide and the banks steep, and in several places large pools of clear water. Marshmallows and other vegetation now perfectly dried up were on the banks. Native camps were numerous; but none that I saw were very recent. Mussel-shells and the claws of crayfish were lying near them. I have every reason to believe that some of these pools are permanent. Crossing this we passed several branch creeks running through a clayey plain, and all lined with trees; large pools of water in several. I named this creek after the Hon. David Wilkie, M.D., M.L.C. On leaving the clay-flats at the creek we again crossed sandhills and undulating country for several miles, mostly well grassed but much burned up. Saltbush and cottonbush plentiful in the hollows, and scattered timber beginning to appear. At half-past two came on a watercourse running north, and containing large but shallow pools of water. The feed round about excellent, and enough timber to be called a thin gum-forest. The gums here a new species not before seen by us, several feet of the butt having a rough semipersistent bark, above which it is smooth and greenish, with a red tint; leaves thick and glossy, very much resembling one growing near Omeo. Ducks here very tame. Camped, having made eighteen miles, and country not looking so well ahead. The general fall seems to be to the westward. Samla, the largest of our camels, lay down just before reaching the camp; he is the only one of the lot that has not improved in condition, and he keeps himself poor by constantly watching the other camels, and driving them away from the females. He only carries 2 cwt.

Sept. 4. Camp 22, Stokes' Ranges; lat. $28^{\circ} 20'$, long. $142^{\circ} 19'$. —Left camp at half-past seven. Travelled for three miles through open gum-forest, growing on clayey land. Water-channels frequent, with occasional small pools of water. Saltbush and grass, but very dry. Then crossed an open plain with claypans, the drainage of which, running westward, forms numerous small box-creeks, which form and spread out again on the plain. No water here, only liquid mud. At about five miles passed a small box-creek with pools of water, and came on an open sandy plain destitute of vegetation, excepting the remains of salsolaceous plants grown last season. At ten o'clock crossed a large dry gum-creek, full of gravel and boulders, coming in an easterly direction from the range. As it lay in our course, we followed it up for some distance, but found no water, although crows, rose cockatoos, and crested pigeons were on it. The country here became stony, but with more dry grass, and gradually rose to the range; from this point the travelling was very severe upon the horses, and consequently very slow, as the ground is everywhere covered with fragments of sharp flint-stones. The ranges are of no great

height, and slope gently upwards; but are cut by numerous deep gorges, filled with blocks of stone and scrub, and mostly containing a dry gum-creek. These lying across our track made it difficult to get on. The mulgar-scrub was very thick in places, a great deal of it dead, and numbers of shrubs new to me. Camped at 3:30 at the edge of a deep scrubby gorge, with plenty of dry grass, but no water. Went down the gorge after camping to look for water, but found none: nor could I see any chance, from the loose gravelly bed and large boulders. Scrub very thick; among other, the native orange, of large size, and covered with unripe fruit. Distance, twenty miles.

Sept. 5. Camp 23, north side of Stokes' Ranges; lat. $28^{\circ} 10'$, long. $142^{\circ} 8'$.—Had some difficulty in crossing the gully this morning, the sides being steep and covered with large blocks of stone; thick mulgar-scrub up both sides. From here, travelled over similar stony ridges to those described yesterday for several hours, crossing two wide deep gorges, each with a dry creek and large gums, and flanked by precipitous stony ranges. On reaching the summit of the range, found it to be a stony tableland, almost devoid of vegetation. Some remarkable flat-topped peaks to the north about 12 miles. At noon, suddenly came to the edge of a bluff overlooking the Cooper's Creek country—apparently a boundless extent of plains, with dark lines of scrub or timber on the horizon. To descend from this bluff to a wide basin of open country below, probably 700 to 800 feet, occupied an hour, and I could only consider it a happy chance that some of the packhorses or camels met with no accident among the large blocks of loose stone. I could not have believed that the camels could have carried their loads up or down such places as we have crossed to-day. On reaching the basin, found it stony to a degree difficult to describe. The ground was literally paved with angular and rounded fragments of sandstone and flint, coated with a shining oxide of iron. Vegetation very scanty, and water nowhere visible, although I saw birds which I have seldom seen far from springs. Travelling for several miles over this country, surrounded by a chain of abrupt square hills, we slowly picked our road as best we could. Several of the horses were very footsore, and most of them fagged with the severe day's work and want of water. The day, too, was unusually warm. At 3:30 found it necessary to camp, the camels and horses being very tired. No water, scarcely any feed.

After camp went to a square steep hill, with Mr. Brabé, to reconnoitre the country. From it had an extensive view towards Cooper's Creek, and was pleased to see that the stony country does not probably extend more than 4 miles from us. Beyond that open plains, and on the horizon what seem to be sandhills

and timber. A large body of smoke to the west. I found the summit of the hill to be covered with large masses of a white crystalline stone, grouped in irregular columns, and ringing with a metallic sound when struck. It is the same stone as that universally strewn over the country, and of which and a coarse sandstone and conglomerate the ranges are mostly formed. Managed to give the horses two quarts of water each, in the hope that they would feed. They were so thirsty that two tried to take the quart-pots off the fire.

Sept. 6. Camp 24; lat. 28° , long. $142^{\circ} 2'$.—Left camp shortly after six. The horses had not fed during the night, partly from thirst, partly being afraid of the stones. Followed down a gully leading into very stony plains, which we crossed for several hours, being obliged to lead the horses very slowly. No timber and scarcely any vegetation; the most desolate, stony wilderness imaginable. About ten o'clock came near the sandhills, and the country improved as regarded travelling, but not for feed or water. On a dry watercourse came on a party of natives, of whom some ran away; the others, consisting of an old grey-haired man, an old hag of a woman, a younger man, and two or three lubras and children, waited until I rode up. They were in a very excited state, waving branches, and jabbering incessantly. The younger man shook all over with fright. Sandy could not understand them, and I could only catch "Gow" (Go on). At last, by the offer of a knife, I prevailed on the old man to come with us to show us the nearest water; but after half a mile his courage gave way, and he climbed up a box-tree to be out of reach. Mr. Brahé rode up to him, when he climbed into the top branches, jabbering without stopping for a moment. Finding that he would not come down, and kept pointing to the north-west (our course), we left him. All the natives were naked, and the old man was the only one who had any covering for his head—a net.

We here entered undulating sandy country, slightly scrubbed and well grassed, and at the same time came on Brahé's down-track. Our horses at once struck into a better pace, going at least $3\frac{1}{2}$ miles an hour. The camels also pushed on well. The loose horses kept wide of the track, looking out for water in the polygonum-ground, and at ten minutes past twelve one old stager found an ample supply in a channel on the right hand. The horses at once made a rush, and it was almost impossible to prevent them drinking as much as they wished. Three had for the last hour shown unmistakeable signs of giving in, and all were very much pinched with thirst. Camped by the water, in first-rate feed. Rain came on steadily from the north-east shortly after, and has continued. The horses have just been a third time to water.

Sept. 7. Camp 24.—It rained very heavily during the night, with strong gusts of wind from north-east, and this morning the flats and claypans are swimming with water, and the ground very soft. Resting to-day, as the horses require it. Drying things, shoeing horses, and digging tank to try and hold water later in the season.

Sept. 8. Camp 25, Cooper's Creek; lat. $27^{\circ} 51'$, long. $141^{\circ} 55'$.—(Half-a-mile above Camp 60 of Victorian Expedition).—Travelled north 60° w., through a succession of sandhills, with flats of rotten polygonum-ground between. The vegetation very green and in full flower, and box-trees growing in most of the flats. Towards noon, after crossing some high red sandhills, came into the earthy plains through which the various channels of Cooper's Creek run to the westward. The ground very rotten, and cracked by numerous deep fissures; dry channels in every direction. About 6 miles brought us to a patch of sandhills, where the bare loose summits were crested with a pink flowering mesembryanthemum; the pink flower, with the orange-coloured sand, and the light-green vegetation, produced a very singular effect. We here suddenly came upon a native camp of four wurleys. Only one black fellow was at home, and the three leading men of our procession came suddenly upon him as he was lying on the ground playing with his dog. He gave a succession of yells, and then ran off as if electrified. Here we crossed the first branch of Cooper's Creek, a wide shallow bed, full of green weeds and grass, and lined with box. From this we crossed about 3 miles of loose earthy plains devoid of vegetation, and camped on the north side of a large branch, near a shallow sheet of water. No feed on the plains, but grass and green weeds in the channel. Large box-trees on the bank. Distance travelled, 24 miles.

Sept. 9. Camp 26; lat. $27^{\circ} 49'$, long. $141^{\circ} 38'$.—While loading up this morning five black fellows made their appearance on the opposite side of the creek, and, as usual, commenced shouting and waving their arms. We cooed in return, and one waded across, but waited on the bank until I broke a branch and beckoned him to come up. The others then followed him; they were all fine, well-built young men, with open, intelligent faces, and very different from the natives usually met with. They wore nets wrapped round their waists, and one, apparently the head man, had his front teeth knocked out. Sandy said he could only understand "narrangy word" they said; but I believe that he could not understand them at all, as he was quite unable to make them comprehend that I wished to know if they had seen any stray camels about the creek. Before we had finished loading, they returned to the opposite bank, and sat down watching us. On our starting they waded across to our camp—probably to pick up

anything left behind, which would be very little. To-day we travelled over earthy plains for 13 miles; they were cracked in every direction, and covered with a network of channels. In times of flood the whole of them must be under water, and I can scarcely imagine anything more luxuriant than the appearance of these plains after a wet season. At present everything is dry and withered, but everywhere the stalks of marsh-mallows and other flowering plants are as high as a horse's back, and very close together. Tufts of grass line each side, and cover the beds of the watercourses. Here and there clumps and lines of timber mark the course of the larger creeks, and sandhills rise like islands from the plains. To the south of west, at about 9 miles, we had a range, probably stony, and following its base a strongly marked line of timber, which I believe to be the main creek. No floods appear to have come down for two seasons, and water-holes which were tolerably well filled five months ago are now dry, or nearly so. At 13 miles crossed a branch, where Burke's marked tree, LXI, stands, and camped at a claypan under a sandhill, about a mile to the west. Strong breeze from the north-east and north all day, and steady rain at night. Near here I observed, for the first time, a new tree, with a rough scaly bark and thick foliage, the leaves small and oval, and set in pairs on a stem. The tree grows to 15 or 20 feet, and bears numbers of flat brown pods, each containing from five to six hard light-brown beans, known by us as the bean-tree.

Sept. 10. Camp 27; lat. $27^{\circ} 39'$, long. $141^{\circ} 30'$.—The rain ceased shortly before sunrise, and the travelling was in consequence very heavy, the earthy plains being not only soft, as before, but sticky. Shortly after leaving camp, saw several natives on a sandhill making signs. I went up to them with Mr. Welch, and after a great deal of trouble persuaded one to come to me. He was a fine-looking fellow, painted white, skeleton fashion, and carried a very long boomerang stuck in his girdle behind. I could make nothing of him, excepting that he gave me a small ball of what seemed to be chewed grass, as a token of friendship, and in return I gave him a piece of cold doughboy I had with me for lunch, which he seemed to relish very much. We travelled till noon over a succession of earthy plains, broken by numerous box-channels, one of which contained a large reach of water, but the feed everywhere was miserably dry and scarce. The country looks wretched. After passing this channel seven natives made their appearance, one of whom Mr. Brahé recognised as one of the party who tried to surprise the *dépôt* last season. They presented him with a small quantity of some dried plant, from a bundle which one of them carried; it had a strong, pungent taste and smell, and I am at a loss to conjecture its use, unless as a

kind of tobacco. Our black boy was frightened, and told me he thought they meant to "look out, kill him"—as I understood—by witchcraft, or enchantment, or poison. They followed us at a distance to our camp, where they sat down a little way off, making signs that they were hungry, and wanted tomahawks. After an hour's waiting they decamped. Killed two deaf adders and a snake of a sulphur colour on the track. Halted near a small pool of water, where there was a little green feed, which has become a rarity; the country looks miserable ahead. Travelling very heavy on the horses, as the mud balls in great lumps. Stony ridges to the south of the creek, at about 4 miles, and a good deal of timber visible on all sides. Weather still threatening rain; flies very troublesome.

Sept. 11. Camp 28; lat. $27^{\circ} 35'$, long. $141^{\circ} 19'$.—Our horses strayed for feed during the night, and made it late before we started. Travelled through a box-forest full of channels, when we came to a dry creek coming from the north-east, with a rocky bed. From here, for some distance, stony ground to the right hand, and deep channels running parallel to each other in a westerly direction. I observed flood-marks considerably higher than our heads on horseback, and the water must be much confined by the stony rises on each side of the creek, although they are probably 2 miles apart. Mint was growing on the edges of the channels, and tea-tree of large size. We then came on a long reach of water about 60 yards wide; the country miserable; not a vestige of feed to be seen anywhere, except the withered and blackened remains of plants on the plains, and occasional patches of green couch-grass in the creek-bed. After this we traversed a box-forest, and came on a deep channel from the north-east, where Mr. Burke's first depôt was situated. The feed was slightly better, owing to the sandy nature of the ground. About noon, passed large reaches of brackish water, and numerous pools of brine in the channels of the creek, but saw no feed anywhere. At length found one place where patches of couch-grass, with green plants and tufts of coarse grass, were growing among the stones, and halted, as the clay-plains before us were perfectly bare. It is long since I have seen such a barren, miserable place as this part of Cooper's Creek. Native camps were numerous, but all deserted. During the day flights of cockatoo-parrots passed us, migrating to the eastward. Where we are camped the creek is wide, with a stony bed; the south bank is formed of limestone, and large quantities of opalised wood are lying about. A short distance above the rocky banks come close down to the creek.

Sept. 12. Camp 29; lat. $27^{\circ} 35'$, long. $141^{\circ} 6'$.—Travelled over clayey plains, with scattered timber and a good deal of

withered herbage. A rugged range, apparently sandstone, with flat-topped hills and peaks to the north, running north-east and south-west, at about 9 miles' distance. At 4 miles passed a wide deep reach of water, several miles in length, between steep banks, and probably brackish, from its colour. Numbers of pelicans, spoonbills, cormorants, and other waterfowl on it. On each side bare cracked plains, extending to the stony rises. At 3 miles more, the stony country on our right-hand closed in numerous deep channels, forming the creek, some of which were rocky, some sandy. Here, as elsewhere, were green grass and plants growing on the sand. Rather thickly timbered. At noon, came to where the creek forces a passage between rocky ridges; the channels are deep and tortuous, and in places encumbered with large blocks of stone. I here saw red gums for the first time on the creek. This continued for 4 miles, with narrow ridges of hard clay, covered with dense polygonum, separating the watercourses, when we came on more open country, with detached sandhills and better feed, though very dry. Large reaches of water; rocky banks of sandstone in places; bars of rock cross the creek. Camped near some sandhills, at a large waterhole. After camping, tried fishing, and good success, only that I lost two hooks, which I can ill spare. Caught five silver perch, weighing from $1\frac{1}{2}$ lb. to 3 lbs., and several others were caught by the party by firelight. The fish excellent, and of a fine flavour. Distance, 17 miles.

Sept. 13. Camp 30; lat. $27^{\circ} 38'$, long. 141° .—Made a short stage to-day, for the sake of feed for the horses, which is a thing to be considered from the dry appearance of the country. Reached the dépôt, Fort Wills, in 3 miles, through country rather better than we have seen for some days. More rain has fallen here lately than elsewhere, and the grass is just springing, but too short to be of much use. I believe this to be the first rain for many months. The water all down the creek, as far as we have come, has fallen at the rate of about 3 feet in the last four months. Found the dépôt as Mr. Brahé left it, the plant untouched, and nothing removed of the useless things lying about but a piece of leather. But from the very evident fact that things are buried, I cannot understand why the natives have not found them. From here, followed down the creek for several miles, and camped at some sandhills near a pool of water. Saw here the track of a large camel going up the creek. The small crested pigeon, spoken of by Sturt, numerous. Cool wind from south-east.

Sept. 14. Camp 31; lat. $27^{\circ} 42'$, long. $140^{\circ} 4'$.—We had a late start this morning, as three of the horses went away, and one ill: indeed, I doubted at first whether he would be able to travel. Followed the course of the creek down for about 9 miles, crossing several branches which go out south, and form a reach of water

before re-entering the main creek. Here the rocky ridges on both sides close in, and the water has forced a narrow deep channel through a perfect wall of rock, forming below the finest reach of water we have yet seen—about 500 yards wide and several miles long, and very deep. The rugged hills on the north side, and the fine gums on its banks, produce a fine effect. The rock through which the channel has been worn is of a hard, flinty nature, inclined to be columnar, but forming huge masses of boulders. Deep round hollows have been worn in these by the floods, and at the water's edge, in one place where I tried the depth, the rock is perpendicular below the surface. Waterfowl, fish, and turtle are plentiful. The immediate neighbourhood, and as far as one can see on each side, is destitute of vegetation and very stony. We had some trouble in getting the horses and camels over the masses of rough stone which block up both sides of the creek. Leaving this, we struck across a large bend, over sandy country, with large red-sand hummocks, and better grassed than any we had yet seen on the creek. More rain must have fallen here, as pools of water were visible in many places. About 3 o'clock struck the creek again, with a wide sandy bed, heavily timbered with box and gum, and scrubby. This creek, I think, had been running slightly, from the watermarks, and a good deal of green grass was growing on the banks. Camped on a large waterhole, about a quarter of a mile below Mr. Burke's first camp after leaving the *dépôt*. We could see where the camels had been tied up, but found no marked tree. To-day I noticed in two or three places old camel-droppings and tracks, where Mr. Brahé informed me he was certain their camels had never been, as they were watched every day near the *dépôt*, and tied up at night. Mr. Burke's camels were led on the way down. It looked very much as if stray camels had been about during the last four months. The tracks seemed to me to be going up the creek, but the ground was too stony to be able to make sure.

Sept. 15. Camp 32; lat. $27^{\circ} 44'$, long. $140^{\circ} 40'$.—On leaving this morning I went ahead with Sandy, to try and pick up Mr. Burke's track. At the lower end of a large waterhole found where one or two horses had been feeding for some months; the tracks ran in all directions to and from the water, and were as recent as a week. At the same place I found the handle of a clasp-knife. From here struck out south for a short distance from the creek, and found a distinct camel's track and droppings on a native path; the footprint was about four months old, and going east. I then set the black boy to follow the creek, and struck across some sandy country in a bend on the north side. No tracks here; and, coming on a native path leading my way, I followed it as the most likely place to see any signs. In about 4

miles this led me to the lower end of a very large reach of water, and on the opposite side were numbers of native wurleys. I crossed at a neck of sand, and at a little distance again came on the track of a camel going up the creek; at the same time I found a native, who began to gesticulate in a very excited manner, and to point down the creek, bawling out "Gow, gow!" as loud as he could. When I went towards him he ran away, and finding it impossible to get him to come to me, I turned back to follow the camel-track and to look after my party, as I had not seen anything of them for some miles. The track was visible in sandy places, and was evidently the same I had seen for the last two days. I also found horse-tracks in places, but very old. Crossing the creek, I cut our track, and rode after the party. In doing so, I came upon 3 lbs. of tobacco, which had lain where I saw it for some time. This, together with the knife-handle, the fresh horse-tracks, and the camel-track going eastward, puzzled me extremely, and led me into a hundred conjectures. At the lower end of the large reach of water before mentioned I met Sandy and Frank looking for me, with the intelligence that King, the only survivor of Mr. Burke's party, had been found. A little farther on I found the party halted, and immediately went across to the blacks' wurleys, where I found King sitting in a hut which the natives had made for him. He presented a melancholy appearance—wasted to a shadow, and hardly to be distinguished as a civilised being but by the remnants of clothes upon him. He seemed exceedingly weak, and I found it occasionally difficult to follow what he said. The natives were all gathered round, seated on the ground, looking with a most gratified and delighted expression. Camped where the party had halted on a high bank close to the water. I shall probably be here ten days, to recruit King before returning.

Sept. 16. Camp 32.—King already looks vastly improved, even since yesterday, and not like the same man. Have commenced shoeing horses and preparing for our return. Wind from south-west, with signs of rain. The natives seem to be getting ready for it.

Sept. 18. Camp 32.—Left camp this morning with Messrs. Brahe, Welch, Wheeler, and King, to perform a melancholy duty which has weighed upon my mind ever since we have camped here, and which I have only put off until King should be well enough to accompany us. We proceeded down the creek for 7 miles, crossing a branch running to the southward, and followed a native track leading to that part of the creek where Mr. Burke, Mr. Wills, and King camped after their unsuccessful attempt to reach Mount Hopeless and the northern settlements of South Australia, and where poor Wills died. We found the two gunyahs

pretty much as King had described them, situated on a sandbank between two waterholes, and about a mile from the flat where they procured the nardoo-seed, on which they managed to exist so long. Poor Wills's remains we found lying in the wurley in which he died, and where King, after his return from seeking for the natives, had buried him with sand and rushes. We carefully collected the remains and interred them where they lay; and, not having a Prayer-book, I read chapter xv. of 1 Corinthians, that we might at least feel a melancholy satisfaction in having shown the last respect to his remains. We heaped sand over the grave, and laid branches upon it, that the natives might understand by their own tokens not to disturb the last repose of a fellow-being. I cut the following inscription on a tree close by, to mark the spot:—

W. J. WILLS, XLV Yrs. W.N.W. A. H.

The field-books, a note-book belonging to Mr. Burke, various small articles lying about, of no great value in themselves, but now invested with an interest from the circumstances connected with them, and some of the nardoo-seed on which they had subsisted, with the small wooden trough in which it had been cleansed, I have now in my possession. We returned home with saddened feelings, but I must confess that I felt a sense of relief that this painful ordeal had been gone through. King was very tired when we returned, and I must most unwillingly defer my visit to the spot where Mr. Burke's remains are lying until he is better able to bear the fatigue.

Sept. 19.—Shoeing horses. A very slow and troublesome job, as many have never been shod before, and our forge is of the most primitive description. This afternoon got the pigeons in order of flying. Their tails being rubbed down by travelling so far in a cage, I got the tails from several crested pigeons, and inserted feathers in the stumps of our carriers, fastening the splices with waxed thread; the plan answered far better than I had expected, and the birds can now fly about the aviary we have made of a tent with the greatest ease.

Sept. 20.—Started the pigeons at daybreak, each with a message fastened to its legs. On throwing them up, they commenced wheeling round the camp, but separated, one being chased by one of the large kites which are always hovering about the creek. After flying round in various directions with great speed they gradually drew across the creek, when we lost sight of three; the

fourth, after making a large circle, pitched in a tree about a mile off. After breakfast he was found under a bush, with a kite watching him; and the feathers of one of the other pigeons were found not far off, it having been killed. Of the two others nothing has been seen, and I hope that they got clear away, but I am much afraid that the experiment has proved a failure; however, I should have thought more of it if the pigeons had made a more decided start. Last night the wind changed from north-east to south-west, and brought up a slight shower. This morning south-west, with heavy clouds, threatening rain. King improving slowly, but very weak. Turned out the white pigeon again this afternoon; he flew into a gum standing in the camp, and has taken up his quarters there—not a proper proceeding for a carrier-pigeon, according to my ideas.

Sept. 21.—Finding it would not be prudent for King to go out for two or three days, I could no longer defer making a search for the spot where Mr. Burke died; and with such directions as King could give, I went up the creek this morning with Messrs. Brahe, Welsh, Wheeler, and Aitkin. We searched the creek upwards for 8 miles, and at length, strange to say, found the remains of Mr. Burke lying among the tall plants under a clump of box-trees, within 200 yards of our last camp, and not 30 paces from our track. It was still more extraordinary that three or four of the party and the two black boys had been close to the spot without noticing it. The bones were entire, with the exception of the hands and feet; and the body had been removed from the spot where it first lay, and where the natives had placed branches over it, to about 5 paces' distance. I found the revolver which Mr. Burke held in his hand when he expired partly covered with leaves and earth, and corroded with rust. It was loaded and capped. We dug a grave close to the spot, and interred the remains wrapped in the union-jack—the most fitting covering in which the bones of a brave but unfortunate man could take their last rest. On a box-tree, at the head of the grave, the following inscription is cut:—

R. O'H. B. 21 | 9 '61. A. H.

Sept. 22.—The pigeon still keeps its quarters at the camp, and comes down to feed now and then. I have removed the message, and shall leave it to its fate. It has been trying hard to rain for two or three days, but does not seem able; great clouds drift over, looking ready to burst, but only squeeze out two or three drops, and then pass over. I expect fully that it will clear up without

rain; another dry season will make Cooper's Creek look fearfully miserable. When the hot weather comes on, the water-holes will many of them be dry, unless filled by rain or a flood. I have written down King's narrative as much as possible in his own words. Shall annex it to this diary. Finished shoeing the horses.

Sept. 23.—Went down the creek to-day, in search of the natives. One of the party accompanied me, and we took two days' rations, in case it should be necessary to prolong our search. Two days after we camped here the natives left, and have not been seen since; and I could not think of leaving without showing them that we could appreciate and reward the kindness they had shown to Burke's party, and particularly to King. For 3 miles we travelled over alluvial flats along the creek, timbered with box and large gums, and dotted with bean-trees, orange-trees of large size, but at present without fruit, various kinds of acacias, and other bushes. To the right hand level flats and sand-ridges, apparently tolerably grassed. We then came on a large reach of water, where four or five natives had just been fishing; their nets were lying on the sand to dry, and the fire yet burning. Not seeing any one about, and getting no answer to a cooeey, we went on. At 3 miles more we passed the first feeder of Strzelecki's Creek, going to the southward, and at a large reach of water below found the natives camped. They made a great commotion when we rode up, but seemed very friendly. I unpacked my blanket, and took out specimens of the things I intended giving them—a tomahawk, a knife, beads, a looking-glass, comb, and flour and sugar. The tomahawk was the great object of attraction; after that the knife; but I think that the looking-glass surprised them most. On seeing their faces some seemed dazzled, others opened their eyes like saucers, and made a rattling noise with their tongues, expressive of surprise. We had quite a friendly palaver, and my watch amused them immensely. When I gave them some of the sugar to taste, it was absurd to see the sleight-of-hand with which they pretended to eat it; I suppose from a fear of being poisoned, which I suppose is general, as our black boys are continually in dread lest the "wild black fellow" should poison them by some means. I made them understand that they were to bring the whole tribe up next morning to our camp to receive their presents, and we parted the best of friends. The names of the principal men are Tchukulow, Mungallee (three in number), Toquunter, Pitchery (three in number, one a funny little man, with his head in a net, and a kite's feather in it—another a tall man, with his beard tied in a point), Pruriekow, and Borokow.

Sept. 24.—This morning, about ten o'clock, our black friends appeared in a long procession, men, women, and children, or, as they here also call them, piccaninnies; and at a mile distance they

commenced bawling at the top of their voices as usual. When collected all together on a little flat, just below our camp, they must have numbered between 30 and 40, and the uproar was deafening. With the aid of King, I at last got them all seated before me, and distributed the presents—tomahawks, knives, necklaces, looking-glasses, combs, among them. I think no people were ever so happy before, and it was very interesting to see how they pointed out one or another who they thought might be overlooked. The piccaninnies were brought forward by their parents, to have red ribbon tied round their dirty little heads. One old woman, Carrawaw, who had been particularly kind to King, was loaded with things. I then divided 50 lbs. of sugar between them, each one taking his share in a union-jack pocket-handkerchief, which they were very proud of. The sugar soon found its way into their mouths; the flour—50 lbs. of which I gave them—they at once called “white fellow nardoo,” and they explained that they understood that these things were given to them for having fed King. Some old clothes were then put on some of the men and women, and the affair ended in several of our party and several of the black fellows having an impromptu “corroborree,” to the intense delight of the natives, and, I must say, very much to our own amusement. They left, making signs expressive of friendship, carrying their presents with them. The men all wore a net girdle; and of the women, some wore one of leaves, others of feathers. I feel confident that we have left the best impression behind us; that the “white fellows,” as they have already learned to call us, will be looked on henceforth as friends; and that, in case of emergency, any one will receive the kindest treatment at their hands.

Sept. 25, at Camp 31.—This morning I turned my face homewards. The object of our mission being fulfilled, I had to do so, but I return with a great regret at not being able to go on. We take back five months' rations from this date, at the scale we have been using, and which has proved sufficient. The party are in the best of health, the horses in fine order, and the camels none the worse for their journey, and decidedly in better health than when they left the Darling. On the edge of a country so well worth exploring, in a tolerably good season, and with the means I now have at my disposal, I feel how much might be done. We camped to-day at our last camp but one coming down the creek, making an easy stage for King. Got in by noon, as the horses were very fresh after their spell. The camels gave us a good deal of trouble this afternoon, and from a cause which may, and probably will, constantly occur. One of the male camels had taken to driving the females about, and fighting with the other male, Sama, who up to this time had been master. To-day the other camel was furious, and, in spite of being short-hobbled, and having his head tied

down to his knee, chased the whole of the camels from the camp, ten minutes after they were let loose; and although Brahé went immediately after them, and was for three hours on their tracks, he was unable to overtake them. Coming back for a horse, he took Sandy with him, and cut across to where he had left the tracks, running north, over some very rough stony country. It was dark before they returned, having found the camels some miles away. From this and similar occurrences I find it very unwise to take male and female camels on a journey together. One is never safe for a day from their straying, and from continual fights between the male camels for mastery. The result is, that the camels are continually harassed, and watch each other instead of feeding. With either all male or all female camels there would be less, or certainly not more trouble, than with horses; and with this drawback, I firmly believe in the suitability of camels for exploring.

Sept. 26.—Made 10 miles, and camped where the creek forces a passage through the rocks.

Sept. 27.—Obliged to stay where we are, as one of the mares foaled during the night. Knocked the foal on the head. Blowing hot wind.

Sept. 28.—Camped at the fish-pond, having made only 15 miles. King very tired; cannot ride on a camel, as he thought, and had to give him a horse, to try if it would be easier for him. Dug up the things planted by Mr. Burke and Mr. Wills, and found the field-books and papers all safe. All hands fishing this evening, and a large number of fish caught, varying from a quarter of a pound to three pounds and a quarter. Blowing a strong hot wind from north and north-east; will dry up the surface-water very fast.

Sept. 29.—The doctor does not consider that King should travel to-day, so shall remain here. Could not have a much better place on the creek—plenty of feed and abundance of fish. A dozen caught this morning, weighed nearly 20 lbs. Two of the party caught 72 lbs. weight from three o'clock to sundown. They are most excellent eating. I do not know any fish of as fine a flavour. Strong gale from north and north-east, and very hot. If this goes on without rain, we shall have some pushing to do before reaching Koliatto;* and, without rain has fallen, I do not think we can depend with certainty on any water from Poria to Nandtherunga Creek—about 180 miles.

Sept. 30.—Camped at our 28th camp. Surface-water nearly all gone, and no feed. Found a small pool at the mouth of a gully, but all the other water in the creek was as salt as brine. Hot wind again.

October 1.—Halted above our 27th camp, at a number of water-

* Also written Koorliatto, Koorlegur, Koorbigur.

holes, where there was pretty good feed. Passed our black friends on the road, who invited us to stop and eat fish and nardoo, and have a corroboree. Strong hot wind from north-west round to north-east—the fifth day now; and it seems to have blown away every sign of clouds. The sky looks hard and blue, with a grey haze on the horizon, and the vegetation is withering fast. Where we camped happened to be not more than a couple of hundred yards from a large native camp, situated in a branch channel, and completely hidden by dense timber and scrub. When we arrived, all the men excepting three old fellows were away, and only the lubras and piccaninnies were at home, in a terrible fright at so many white fellows squatting down close to them. They began to pack up their things for a flight; but an amicable understanding being brought about, and some of the men returning, we were soon the best of friends. I distributed the few remaining presents, and they gave in return some chewed pitchery and nardoo-balls. One old greybeard had been as far as Wanominta Creek, and could repeat the names of the various waters between here and that place, *via* Balloo; but I found him impenetrable on any other road. There were about twenty men, all well made and well fed; and several were old patriarchs, and some of them apparently old rascals too. They were far more inclined to be troublesome and importunate than our friends lower down, particularly one tall young fellow, rubbed all over with red earth, who pestered me for a tomahawk. One of them had had his arm broken above the wrist, and roughly bandaged up with rags and grass-cord; the doctor set it properly, and it was remarkable to see the perfect composure with which the black fellow bore the operation. In assisting, I had to use my clasp-knife to cut bark-splints, and, laying it down beside me, it of course vanished, and I saw no more of it; but, strange to say, in the same place shortly afterwards one of the knives was found which I had given the black fellows, which, I suppose, they had exchanged for mine, on the principle of the old saying, that “exchange is no robbery.” After a while the natives began to draw in too close to our camp, talking a good deal about our “portos,” or bundles, so that we had to draw a line as a boundary—a hint they took at once, and all squatted down beyond it. At dusk I fired off two rockets, to their unbounded surprise; but they were not so alarmed as I expected, probably from feeling that we were kindly disposed towards them. I believe that the sight of us smoking, and seeing the smoke coming out of our mouths, alarmed them much more, as some made signs to put the pipe away, and others got up and walked off, looking behind them. At dark they retired to their camp.

Oct. 2.—This morning the natives came up and commenced a brisk trade in nets, grass-string girdles, boomerangs, and other

things, for old clothes, rags, and such like valuable property. For part of an old blanket I obtained two boomerangs; a large staff used in digging roots; one of the long-pointed sticks used in fishing; a stone tomahawk, cemented into a box-wood handle; and the head of a larger one, about the size and shape of an American axe, which the proprietor, a tall old warrior, with one very sinister eye, scraped up from the sand by his hut. The smaller tomahawk he dropped twice between his camp and ours, and pretended he had never had it, until I made him understand that I was not going to be done, when he burst out laughing, and sent his lubra back for it. The whole mob sat down by our camp, and observed us packing up with great interest, but were terribly frightened at the horses, more so than at the camels. They accompanied us for half a mile on our road, and then waited looking after us for a while. Camped at some sandhills near our 26th camp; the only water near being a pool of liquid mud, from which we obtained a small supply of water by draining the surface. In going up, this was a fine channel. Day rather hot, but the wind from the south, and a great improvement on the last five of hot winds.

Oct. 3.—This morning the clouds began to bank up from the south, drawing northward, with every sign of a thunder-storm. During the time we were travelling, before reaching our camp, the clouds continued to gather in masses, threatening rain, but dispersed as they passed over towards an arch of blue sky to the north. The country much greener since we came down, owing to the two nights' rain we had. Camped at the remains of what was a large sheet of water in one of the branches of the creek. It has now a very unpleasant taste of soda, and produces thirst, rather than quenches it. Sent Phillips away after dinner on one of the spare horses, to run our track as far as possible before night among the sandhills, to see if there was any water in the polygonum-flats. The clouds still gathering, and thunder and heavy rain to the north-west and south-east. We lit a fire at dark on the edge of the plain, but had great difficulty in keeping it up, as the natives had burned all the dead wood near the water; by means of this, and rockets fired occasionally, Phillips returned about nine o'clock, having been 10 miles on the track. He reported the water to be almost dried up, and had only seen two small pools of mud. The night very dark, with thunder and lightning, but no rain.

Oct. 4.—Started late this morning, as I wished all the horses to drink well before leaving the creek; and also as I had to send the camels 2 miles to fill the water-bags, this pool being scarcely drinkable. I went on ahead of the party to search for water, but did not leave the track for the 10 miles Phillips had been over. The sandhills are looking splendid, the two nights' rain having covered them with grass and herbage; and even the earthy flats between

the ridges show some signs of vegetation. About three o'clock I came on four native children sleeping under the shade of a box-tree, and covered with nets. One waking suddenly, started up in a terrible fright at such an unusual sight, and ran off screaming into the polygonum, where I saw its mother peeping at me through a bush. When I called out to her to come, she did so, but kept at a very respectful distance. I asked her for water, and, to reassure her, gave her an old handkerchief. She got her children gathered round her, two on her back, and one carrying a fourth, all of them screaming loudly; and, having pointed out a little pool of mud, moved off to a sandhill, where she commenced bawling to some of the natives, who seemed to be about half-a-mile off. I went off to hunt over the flat for water, and shortly heard shouts of "Gew, gew," behind me, from three natives, who came running up in an excited state, each with a boomerang or a waddy. We soon, however, came to a friendly understanding by means of the few words I knew; and the promise of a knife decided them to show me the water. One of them, a jolly-looking young fellow, minus his front teeth, took the lead; the other two, both of them dressed in red paint and a head-net, keeping a little on one side. We kept up a sort of conversation, and in half an hour came to their camp, a large hut on a sandhill, with a small pool of water near, among the clay-pans. I was very much amused at the ceremonious way in which my guide led the way, pointing out the best road, and very earnestly making me notice the bushes in my way, as if I were in danger of falling over them. They gave me as usual a ball of chewed pitchery, and seemed very much surprised that neither I nor my horses cared about drinking. I found it quite impossible to make them understand that the water-hole was too small. My guide, having received his knife, was now very anxious to have my shirt, which, of course, I objected to; and, as I could learn nothing more, I gave them a few matches, and rode on my way. My four black friends, however, either out of politeness, or in the hopes of getting my shirt, followed me, and kept so close behind the tail of my horse, each with a waddy in his hand, that I thought it best to send them back to their camp, whither they went, after some jabbering among themselves. About 3 miles farther on I found eight small channels of water in a polygonum-flat, containing sufficient water for ourselves and our horses for two days. Camped here, when the party came up, in splendid feed.

Oct. 5.—Camped to-day at the tank, which, with the channel by it, is brimful of water. The country looks beautiful, the sandhills are covered with flowers and bushes in full bloom, and swarm with birds of all kinds. It has every appearance of being spring here. Passed several fine channels of water by the track. Natives in various places scattered through these sandhills. It is very

difficult to estimate the number of the blacks here, but I believe they cannot be far short of 400, belonging to Cooper's Creek.

Oct. 6, Stokes' Ranges, Surprise Creek.—Left the tank this morning, carrying as much water as possible on the camels, and two horseloads, sufficient for ourselves for four days, and one drink for the horses; calculating on making Koliatti or Poria Creek in four days. If I find water on the track, I intend striking for Wilkie's Creek. The sandhills covered with grass and flowers, and even the bare clayed plains and the miserable stony country between them and the ranges had struggled into something resembling vegetation. The ranges, where we entered them, by Brahe's Gap, are not so high as where we crossed them more to the westward, but ran in low ridges along wide stony valleys, formed by the numerous gorges we found so difficult to cross. Mulga and acacia scrub everywhere, but not much feed; only salt-bush and very short herbage grown since the rains. We were agreeably surprised by a fine water-hole in the first creek we came to, which proved to be the lowest of several of nearly the same size higher up the creek. I believe it to be about 10 yards wide and 80 long, and some 3 or 4 feet deep. Distance 18 miles.

Oct. 7, Stokes' Ranges, Keppel Creek; lat. $28^{\circ} 17'$, long. $142^{\circ} 30'$.—We were late in leaving camp this morning, as nineteen of the horses had followed the track back for several miles. The country travelled through for 15 miles was much of the same character—wide stony flats surrounded by low ridges, and intersected by gum-creeks coming from the gorges in a northerly direction. We passed through a succession of gaps, in each of which we found a creek with pools of clear rain-water; and, from the very loose gravelly nature of the ground, I am inclined to believe that these creeks are still running slowly underground since the rain. At 15 miles came on the south slopes of the range, with a wide view towards Koliatti and Poria. Camped on a small watercourse near its junction with Keppel Creek. Two tolerable pools of water. Another make-believe thunderstorm to-night, with violent gusts of wind, but no rain, excepting at two places to the north-west, where it appeared to be raining, about a mile wide. Everything looks spring-like here.

Oct. 8, Junction Camp, No. 21.—Crossed Keppel Creek, and crossed over stony slopes for 6 miles, when we crossed the creek on to barren sandy plains. At 3 miles entered the sandhills, and found the country terribly burned up, and no signs of water. Rain cannot have fallen here for some time. Made our old camp in 22 miles from Keppel Creek, and found water still in the small creek, but the feed very dry and scanty.

Oct. 9, Poria Creek.—When the party started this morning I went to the westward of the track, and found that at a short

distance the sandhills terminated in the gum-forest and polygonum-swamps before mentioned. From a high sandhill I could see across these for many miles towards the range, in a westerly direction; and I believe that they also extend to or across Wilkie Creek to the south. I found no water, but I am convinced that there are other channels similar to the one we camped on last night, which will contain water for months after rain. At Wilkie Creek I again left the track, and followed the creek upwards, crossing several deep channels running in and out from it, and full of water. At a short distance I came on a large sheet of water, certainly more than a mile long, and about 80 feet wide, and, with the couch-grass growing on its banks and large box-timber, having a striking resemblance to some of the smaller branches of Cooper's Creek. It is a far finer watercourse than I at first supposed. Made Poria Creek about two o'clock. The country very dry and parched; we seem, in one day's journey, to have travelled from spring to spring.

WILLS'S Diary from Cooper's Creek to Carpentaria.

Fieldbook No. 1.—Cooper's Creek to Carpentaria.

[The omissions in the diary are supplied by the information contained in the maps, with the exception of the last two days on the shore of the Gulf.]

Sunday, December 16, 1860.—The two horses having been shod, and our reports finished, we started at 6:40 A.M. for Eyre's Creek; the party consisting of Mr. Burke, myself, King, and Charley, having with us six camels, one horse, and three months' provisions. We followed down the creek to the point where the sandstone ranges cross the creek, and were accompanied to that place by Brahé, who would return to take charge of the dépôt. Down to this point the banks of the creek are very rugged and stony, but there is a tolerable supply of grass and salt-bush in the vicinity. A large tribe of blacks came pestering us to go to their camp and have a dance, which we declined. They were very troublesome, and nothing but the threat to shoot them will keep them away; they are, however, easily frightened, and, although fine-looking men, decidedly not of a warlike disposition. They show the greatest inclination to take whatever they can, but will run no unnecessary risk in so doing. They seldom carry any weapons, except a shield and a large kind of boomerang, which I believe they use for killing rats, &c.; sometimes, but very seldom, they have a large spear; reed-spears seem to be quite unknown to them. They are undoubtedly a finer and better looking race of men than the blacks on the Murray and Darling, and more peaceful; but in other respects I believe they did not compare favourably with them, for,

from the little we have seen of them, they appear to be mean-spirited and contemptible in every respect.

Monday, Dec. 17.—We continued to follow down the creek. Found its course very crooked, and the channel frequently dry for a considerable distance, and then forming magnificent water-holes, abounding in waterfowl of all kinds. The country on each side is more open than on the upper part of the creek. The soil on the plains is of a light earthy nature, supporting abundance of salt-bush and grass. Most of the plains are lightly timbered, and the ground is finer, and not cracked up, like at the head of the creek. Left Camp No. 67 at ten minutes to six A.M., having breakfasted before leaving. We followed the creek along from point to point, at first in a direction w.n.w. for about 12 miles, then about north-west. At about noon we passed the last water, a short distance beyond which the creek runs out on a polygonum (*Polygonum Cunninghami*) flat; but the timber was so large and dense, that it deceived us into the belief that there was a continuation of the channel; on crossing the polygonum-ground to where we expected to find the creek, we became aware of our mistake. Not thinking it advisable to chance the existence of water a-head, we camped at the end of a large but shallow sheet of water in the sandy bed of the creek. The hole was about 150 links broad. In most places the temperature of the water was almost incredibly high, which induced me to try it in several places. The mean of two on the shady side of the creek gave 97.4° . As may be imagined, this water tasted disagreeably warm, but we soon cooled some in water-bags, and, thinking that it would be interesting to know what we might call cool, I placed the thermometer in a pannikin containing some that appeared delightfully cool—almost cold, in fact. Its temperature was, to our astonishment, 78° . At half-past six, when a strong wind was blowing from south, and the temperature of the air had fallen to 80° , the lowest temperature of water in the hose, that had been exposed to the full effect of evaporation for several hours, was 72° . This water for drinking appeared positively cold, too low a temperature to be pleasant under the circumstances. A remarkable southerly squall came on between five and six P.M., with every appearance of rain. The sky, however, soon cleared, but the wind continued to blow in a squally and irregular manner, from the same quarter at evening.

Wednesday, Dec. 19.—Started at a quarter past eight A.M., leaving what seemed to be the end of Cooper's Creek. We took a course a little to the north of west, intending to try and obtain water in some of the creeks that Sturt mentioned that he had crossed, and at the same time to see whether they were connected

with Cooper's Creek, as appeared most probable from the direction in which we found the latter running, and from the manner in which it had been breaking up into small channels flowing across the plains in a north and N.N.W. direction. We left on our right the flooded flats on which this branch of the creek runs out, and soon came to a series of sand-ridges, the direction of which was between north $\frac{1}{4}$ -west and N.N.W. The country is well grassed, and supports plenty of salt-bush. Many of the valleys are liable to be inundated by the overflow of the main creek. They have watercourses and polygonum-flats, bordered with box-trees, but we met with no holes fit to hold a supply of water. At about 10 miles we crossed a large earthy flat, lightly timbered with box and gum. The ground was very bad for travelling on, being much cracked up, and intersected by innumerable channels, which continually carried off the water of a large creek. Some of the valleys beyond this were very pretty; the ground being sound and covered with fresh plants, which made them look beautifully green. At 15 miles we halted, where two large plains joined. Our attention had been attracted by some red-breasted cockatoos, pigeons, a crow, and several other birds, whose presence made us feel sure that there was water not far off; but our hopes were soon destroyed by finding a claypan just drying up. It contained just sufficient liquid to make the clay boggy. At ten minutes to seven P.M. we moved on, steering straight for Eyre's Creek, north-west by north, intending to make a good night's journey, and avoid the heat of the day; but at a mile and a half we came to a creek, which looked so well that we followed it for a short distance, and, finding two or three water-holes of good milky water, we camped for the night. This enabled me to secure an observation of the eclipse of Jupiter's 1st satellite, as well as some latitude observations. The night was so calm that I used the water as a horizon, but I find it much more satisfactory to take the mercury, for several reasons.

Thursday, Dec. 21 (20).—We did not leave this camp until half-past eight, having delayed to refill the water-bags with the milky water, which all of us found to be a great treat again. It is certainly more pleasant to drink than the clear water, and at the same time more satisfying. Our course from here, north-west by north, took us through some pretty country, lightly timbered and well grassed. We could see the line of creek-timber winding through the valley on our left. At a distance of 5 miles there was a bush-fire on its banks, and beyond it the creek made a considerable bend to the south-west. At 2 miles farther we came in sight of a large lagoon bearing north by west, and at 3 miles more we camped on what would seem the same creek as last night, near where it enters the lagoon. The latter is of great extent, and contains a large quantity of water, which swarms with wild fowl of

every description. It is very shallow, but is surrounded by the most pleasing woodland scenery, and everything in the vicinity looks fresh and green. The creek near its junction with the lagoon contains some good water-holes, 5 to 6 feet deep. They are found in a sandy alluvium, which is very boggy when wet. There was a large camp of not less than forty or fifty blacks near where we stopped. They brought us presents of fish, for which we gave them some beads and matches. These fish we found to be a most valuable addition to our rations. They were of the same kind as we had found elsewhere, but finer, being 9 to 10 inches long, and 2 to 3 inches deep, and in such good condition that they might have been fried in their own fat. It is a remarkable fact, that these were the first blacks who have offered us any fish since we reached Cooper's Creek.

Friday, Dec. 21.—We left Camp 70 at half-past five A.M., and tried to induce one or two of the blacks to go with us, but it was of no use. Keeping our former course we were pulled up at 3 miles by a fine lagoon, and then by the creek that flows into it: the latter being full of water, we were obliged to trace it a mile up before we could cross. I observed on its banks two wild plants of the gourd or melon tribe; one much resembling a stunted cucumber, the other, both in leaf and appearance of fruit, was very similar to a small model of a water-melon (probably *Muckia micrantha*). The latter plant I also found at Camp 68. On tasting the pulp of the newly-found fruit, which was about the size of a large pea, I found it to be so acrid that it was with difficulty that I removed the taste from my mouth. At 8 or 9 miles from where we crossed the creek we passed another large lagoon, leaving it 2 miles on our left, and shortly afterwards we saw one nearly as far on our right. This last we should have availed ourselves of, but that we expected to find water in a creek which we could see, by the timber lining its banks, flowed from the lagoon on our left, and crossed our course a few miles a-head. We reached it at a distance of 4 or 5 miles farther, and found a splendid water-hole, at which we camped. The creek at this point flows in a northerly direction, through a large lightly-timbered flat, on which it partially runs out. The ground is, however, sound and well clothed with grass and salsolaceous plants. Up to this point the country through which we have passed has been of the finest description for pastoral purposes. The grass and salt-bush are everywhere abundant, and water is plentiful, with every appearance of permanence. We met with porcupine-grass (*Triodia pungens*, Br.) and only two sandridges before reaching Camp 71.

Cooper's Creek to Carpentaria.—Fieldbook No. 2; lat. 27° to $25\frac{1}{2}^{\circ}$ s. Camp 72 to 78.

Saturday, Dec. 22.—At five minutes to five A.M. we left one of the most delightful camps we have had in the journey, and proceeded on the same course as before, north-west by north, across some high ridges of loose sand, many of which were partially clothed with porcupine-grass. We found the ground much worse to travel over than any we have yet met with, as the ridges were exceedingly abrupt and steep on their eastern side, and although sloping gradually towards the west, were so honeycombed in some places by the burrows of rats, that the camels were continually in danger of falling. At a distance of about 6 miles we descended from these ridges to undulating country of open box-forest, where everything was green and fresh. There is an abundance of grass and salt-bushes, and lots of birds of all descriptions. Several flocks of pigeons passed over our heads, making for a point a little to our right, where there is no doubt plenty of water, but we did not go off our course to look for it. Beyond the box-forest, which kept away to the right, we again entered the sand-ridges, and at a distance of 6 miles passed close to a dry salt-lagoon, the ridges in the vicinity of which are less regular in their form and direction, and contain nodules of limestone. The ground in the flats and claypans near has that encrusted surface which cracks under the pressure of the foot, and is a sure indication of the presence of saline deposits. At a distance of 8 miles from the lagoon we camped at the foot of a sand-ridge, jutting out on the stony desert. I was rather disappointed, but not altogether surprised, to find the latter nothing more nor less than the stony rises that we had before met with, only on a larger scale, and not quite as undulating. During the afternoon several crows came to feed on the plain. They came from an E.N.E. direction, no doubt from a portion of the creek that flows through the forest which we left on our right. In the morning, as we were loading, a duck passed over, but it was too dark to see which way it went.

Sunday, Dec. 23.—At five A.M. we struck out across the desert in a W.N.W. direction. At 4 miles and a half we crossed a sand-ridge, and then returned to our N.W. by N. course. We found the ground not nearly so bad for travelling on as that between Bulloo and Cooper's Creek—in fact, I do not know whether it arose from our exaggerated anticipation of horrors or not, but we thought it far from bad travelling ground; and as to pasture, it is only the actually stony ground that is bare, and many a sheep-run is worse grazing than that. At 15 miles we crossed another sand-ridge, for several miles around which there is plenty of grass

and fine salt-bush. After crossing this ridge we descended to an earthy plain where the ground was rather heavy, being in some places like pieces of slaked lime and intersected by small water-courses. Flocks of pigeons rose from amongst the salt-bushes and polygonum, but all the creeks were dry, although marked by lines of box-timber. Several gunyahs of the blacks were situated near a water-hole that had apparently contained water very lately, and heaps of grass were lying about the plains, from which they had beaten the seeds. We pushed on, hoping to find the creeks assuming an improved appearance, but they did not, and at one o'clock we halted, intending to travel through part of the night; about sunset three flocks of pigeons passed over us, all going in the same direction, due north by compass, and passing over a ridge of sand in that direction. Not to have taken notice of such an occurrence would have been little short of a sin, so we determined to go 8 or 10 miles in that direction. Starting at seven o'clock P.M., we, at 6 miles, crossed the ridge over which the birds had flown, and came on a flat, subject to inundation; the ground was at first hard and even, like the bottom of a claypan, but at a mile or so we came on cracked earthy ground, intersected by numberless small channels running in all directions. At 9 miles we reached the bed of a creek running from east to west; it was only bordered by polygonum-bushes; but as there was no timber visible on the plains, we thought it safer to halt until daylight, for fear we should miss the water. At daylight, when we had saddled, a small quantity of timber could be seen, at the point of a sand-ridge, about $1\frac{1}{2}$ to 2 miles to the west of us, and on going there we found a fine creek, with a splendid sheet of water, more than a mile long and averaging nearly three chains broad; it is, however, only 2 or 3 feet deep in most parts.

Monday, Dec. 24.—We took a day of rest on Gray's Creek to celebrate Christmas. This was doubly pleasant, as we had never in our most sanguine moments anticipated finding such a delightful oasis in the desert. Our camp was really an agreeable place, for we had all the advantages of food and water attending a position on a large creek or river, and were at the same time free from the annoyance of the numberless ants, flies, and mosquitoes that are invariably met with amongst timber or heavy scrub.

Tuesday, Dec. 25.—We left Gray's Creek at half-past four A.M., and proceeded to cross the earthy rotten plains in the direction of Eyre's Creek. At a distance of about 9 miles we reached some lines of trees and bushes, which were visible from the top of the sand-ridge at Gray's Creek. We found them growing on the banks of several small creeks, which trend to the north and N.W. At a mile and a half farther we crossed a small creek, N.E., and joining the ones above-mentioned. This creek contained abundance

of water, in small detached holes, from 50 to 100 links long, well shaded by steep banks and overhanging bushes. The water had a suspiciously transparent colour and a slight trace of brackishness, but the latter was scarcely perceptible. Near where the creek joined them is a sandhill and a dense mass of fine timber. The smoke of a fire indicated the presence of blacks, who soon made their appearance, and followed us for some distance, beckoning us away to the north-east. We, however, continued our course to the north-west by north; but, at a distance of a mile and a half, found that the creeks did not come round as we expected, and that the fall of the water was in a direction nearly opposite to our course, or about west to east. We struck off north $\frac{1}{2}$ -west for a high sand-ridge, from which we anticipated seeing whether it were worth while for us to follow the course of the creeks we had crossed. We were surprised to find all the watercourses on the plains trending rather to the south of east; and at a distance of 3 miles, after changing our course, and when we approached the sandhills towards which we had been steering, we were agreeably pulled up by a magnificent creek, coming from the N.N.W. and running in the direction of the fire we had seen. We had now no choice but to change our course again, for we could not have crossed even if we had desired to do so. On following up the south bank of the creek, we found it soon keeping a more northerly course than it had where we first struck it. This fact, together with its magnitude and general appearance, lessened the probability of its being Eyre's Creek, as seemed at first very likely from their relative positions and directions. The day being very hot, and the camels tired from travelling over the earthy plains, which, by-the-by, are not nearly so bad as those at the head of Cooper's Creek, we camped at one o'clock P.M., having traced the creek up about 5 miles, not counting the bends. For the whole of this distance we found not a break or interruption of water, which appears to be very deep: the banks are from 20 to 30 feet above the water, and very steep; they are clothed near the water's edge with mint and other weeds, and on the top of each side there is a belt of box-trees and various shrubs. The lower part of the creek is bounded towards the north by a high red sand-ridge, and on the south side is an extensive plain, intersected by numerous watercourses, which drain off the water in flood time. The greater portion of the plain is at present very bare, but the stalks of dry grass show that after rain or floods there will be a good crop on the harder and well-drained portion: I believe the loose earthy portion supports no vegetation at any time. The inclination of the ground from the edge of the creek-bank towards the plain is in many places very considerable. This I should take to indicate that the flooding is or has been at one time both frequent and regular.

Wednesday, Dec. 26.—We started at 5 A.M., following up the creek from point to point of the bends; its general course was at first north by west, but at about 6 miles the sand-ridge on the west closed in on it, and at this point it takes a turn to the N.N.E. for half-a-mile, and then comes around suddenly north-west. Up to this point it had been rather improving in appearance than otherwise, but in the bend to the north-west the channel is very broad: its bed, being limestone-rock and indurated clay, is, for a space of 5 or 6 chains, quite dry; then commences another water-hole, the creek keeping a little more towards north. We crossed the creek here and struck across the plain on a due north course, for we could see the line of timber coming up to the sand-ridges in that direction. For a distance of 7 or 8 miles we did not touch the creek, and the eastern sand-ridge receded to a distance in some places of nearly 3 miles from our line, leaving an immense extent of grassy plain between it and the creek. The distinctly-marked feature on the lower part of this creek is, that whenever the main creek is on one side of a plain, there is always a fine billibong on the opposite side, each of them almost invariably sticking close to the respective sand-ridges. Before coming to the next bend of the creek, a view from the top of a sandhill showed me that the creek receives a large tributary from the north-west, at about 2 miles above where we had crossed it. A fine line of timber running up to the north-west joined an extensive tract of box-forest, and the branch we were following was lost to view in a similar forest towards the north. The sand-ridge was so abrupt when we came to the creek, that it was necessary to descend into its bed through one of the small ravines adjoining it. We found it partially run out; the bed being sand, and strewed with nodules of lime, some of which were $1\frac{1}{2}$ to 2 feet long. They had apparently been formed in the sand-downs by infiltration.

Cooper's Creek to Carpentaria.—Fieldbook No. 3; lat. s. $25\frac{1}{2}^{\circ}$ to $23\frac{3}{4}^{\circ}$. Station 78 to 85.

Tuesday, December 30.—Finding that the creek was trending considerably towards the east, without much likelihood of altering its course, we struck off from it, taking a ten days' supply of water, as there were ranges visible to the north which had the appearance of being stony. A north-east by north course was first taken for about 7 miles, in order to avoid them. The whole of this distance was over alluvial earthy plains, the soil of which was firm, but the vegetation scanty.

Cooper's Creek to Carpentaria.—Fieldbook No. 4. Camp 85 to 90; lat. $23\frac{1}{2}^{\circ}$ to $22\frac{1}{2}^{\circ}$.—Fine country, Tropics.

Saturday, Jan. 5, 1861.—On leaving Camp 84, we found slight but distinct indications of rain in the groves, and a few blades of grass and small weeds in the little depressions on the plain. These indications were, however, so slight, that but for the fact of our having found surface-water in two holes near our camp, we should hardly have noticed them. At a distance of about 2 miles, in a N.N.E. direction, we came to a creek with a long, broad, shallow water-hole. The well-worn paths, the recent track of natives, and the heaps of shells, on the contents of which the latter had feasted, showed at once that this creek must be connected with some creek of considerable importance. The camels and horses being greatly in need of rest, we only moved up about half a mile, and camped for the day.

Sunday, Jan. 6.—Started at twenty minutes to six o'clock, intending to make an easy day's stage along the creek. As we proceeded up in a northerly direction we found the water-hole to diminish in size very much, and at about $2\frac{1}{2}$ miles the creek ran out in a lot of small watercourses. At the upper end of the creek we found in its bed what appeared to be an arrangement for catching fish. It consisted of a small oval mud-paddock, about 12 feet by 8 feet, the sides of which were about 9 inches above the bottom of the hole, and the top of the fence, covered with long grass, so arranged that the ends of the blades overhung scantily by several inches the sides of the hole. As there was no sign of timber to the north, we steered off to north-west by north for a fine line that came up from the south-west, and seemed to run parallel with the creek we were about to leave. At a distance of about 3 miles we reached the bank of a fine creek containing a sheet of water two chains broad, and at least 15 feet deep in the middle. The banks are shelving, sandy, and lightly clothed with box-trees and various shrubs. On starting to cross the plains towards this creek, we were surprised at the bright green appearance of strips of land, which look in the distance like swamps. On approaching some of them we found that there had been a considerable fall of rain in some places, which had raised a fine crop of grass and portulac* wherever the soil was of a sandy and light nature; but the amount of moisture had been insufficient to affect the clayey ground which constitutes the main portion of the plain. The sight of two native companions feeding here added greatly to the encouraging prospects; they are the only specimens of that bird that I remember to have seen on that side of the Darling.

Jan. 7.—We started at half-past four A.M. without water, thinking

* *Portulaca oleracea*.—L.

that we might safely rely on this creek for one day's journey. We, however, found the line of timber soon begin to look small; at 3 miles the channel contained only a few pools of surface-water. We continued across the plains on a due north course, frequently crossing small watercourses, which had been filled by the rain, but were fast drying up. Here and there as we proceeded dense lines of timber on our right showed that the creek came from the east of north. At a distance of 13 miles we turned to the N.N.E., towards a fine line of timber. We found a creek of considerable dimensions that had only two or three small water-holes; but as there was more than sufficient for us, and very little feed for the beasts anywhere else, we camped. I should have liked this camp to have been in a more prominent and easily recognised position, as it happens to be almost exactly on the tropic of Capricorn. The tremendous gale of wind that we had in the evening and night prevented me from taking a latitude observation, whereas I had some good ones at the last camp, and at Camp 86. My reckoning cannot be far out. I found on taking out my instruments one of the spare thermometers was broken, and the glass of my aneroid barometer cracked; the latter, I believe, not otherwise injured. This was done by the camel having taken it into his head to roll while the pack was on his back.

Tuesday, Jan. 8.—Started at a quarter past 5 A.M. with a load of water, determined to be independent of all creeks and watercourses. At a mile and a half found surface-water in a small creek, and at a mile farther water in two or three places on the open plains. The country we crossed for the first 10 miles consists of fine open plains of firm argillaceous soil, too stiff and hard to be affected by the small quantity of rain that has fallen as yet. They are subject to inundations from the overflow of a number of small creeks which intersect them in a direction E.N.E. to W.S.W. Nearly all the creeks are lined with box-trees and shrubs, in a tolerably healthy state; of the remains of dead trees there is only a fair proportion to the living ones. After traversing a plain of greater extent than the rest, we at 10 miles reached the creek, proportionately large and important-looking. The channel, however, at the point where we struck it, was deep, level, and dry, but I believe there is water in it not far off; for there were some redbreasted cockatoos in the trees, and native parrots on each side. On the north side there is a part bearing off to the N.N.W. The mirage on the plain to the south of the creek was stronger than I have before seen it. There appear to be sheets of water within a few yards of one, and it looks sufficiently smooth and glassy to be used for an artificial horizon. To the westward of the plains some fine sand-hills were visible, nearly in the direction in which the creek flowed. To the north of the creek the country undergoes a great change.

At first there is a little earthy land subject to inundation. The soil then becomes more sandy, and the stony pans occur in which water collects after rain; the whole country is slightly undulating, lightly timbered, and splendidly grassed. A number of small disconnected creeks are scattered about, many of which contained water, protected from the sun by luxuriant growth of fine grasses and small bushes. We passed one or two little rises of sand and pebbles, on which were growing some trees quite new to me: but for the seed-pods, I should have taken them for a species of *casuarinae*, although the leaf-stalks have not the jointed peculiarities of those plants. The trunks and branches are like the she-oak, the leaves like those of a pine; they droop like a willow; and the seed is small, flat, in a large flat pod about 6 inches by three-quarters of an inch. As we proceeded the country improved at every step. Flocks of pigeons rose and flew off to the eastward, and fresh plants met our view on every rise; everything green and luxuriant. The horse licked his lips, and tried all he could to break his nose-string to get at the feed. We camped at the foot of a sandy rise, where there was a large stony pan with plenty of water, and where the feed was equal in quantity, and superior as to variety, to any that I have seen in Australia, excepting, perhaps, on some soils of volcanic origin.

Wednesday, Jan. 9.—Started at five minutes past five without water, trusting to get a supply from the rain that fell during the thunderstorm. Traversed 6 miles of undulating plains covered with vegetation richer than ever. Several ducks rose from the little creeks as we passed, and flocks of pigeons were flying in all directions. The richness of the vegetation is evidently not sudden, arising from chance thunderstorms, for the trees and bushes on the open plain are everywhere healthy and fresh-looking; very few dead ones are to be seen; besides which the quantity of dead and rotten grass which at present almost overgrows in some places the young blades, shows that this is not the first crop of the kind. The grasses are numerous, and many of them unknown to me, but they only constitute a moderate portion of the herbage; several kinds of spurious vetches and portulac, as well as *salsolaceae*, add to the luxuriance of the vegetation. At 7 miles we found ourselves in an open forest-country, where the feed was good, but not equal to what we had passed, neither had it been visited by yesterday's rain. We soon emerged again on open plains, but, the soil being of a more clayish nature, they were not nearly so much advanced in vegetation as the others. We found surface-waters in several places, and at one spot disturbed a fine bustard which was feeding in the long grass. We did not see him until he flew up. I should have mentioned that one flew over our camp last evening in a northerly direction: this speaks well for the country and climate. At noon we came to a large creek, the

course of which was from E.N.E. to W.S.W. The sight of white gum-trees in the distance had raised hopes which were not at all damped on a close inspection of the channel. At the point where we struck it there was certainly no great quantity of water; the bed was broad and sandy, but its whole appearance was that of an important watercourse; and the large gums which line its banks, together with the improved appearance of the soil, and the abundance of feed in the vicinity, satisfied us as to the permanency of the waters and the value of the discovery. Although it was so early in the day, and we were anxious to make a good march, yet we camped here, as it seemed to be almost a sin to leave such good quarters. The bed of the creek is loose sand, through which the water freely permeates: it is, however, sufficiently coarse not to be boggy; and animals can approach the water without any difficulty.

Thursday, Jan. 10.—At 5-20 A.M. we left our camp with a full supply of water, determined to risk no reverses, and to make a good march. I should mention that last evening we had been nearly deafened by the noise of the cicadæ, and but for our large fires should have been kept awake all night by the mosquitoes. A walk of 2 miles across a well-grassed plain brought us to a belt of timber, and we soon afterwards found ourselves pulled up by a large creek, in which the water was broad and deep. We had to follow up the bank of the creek in a north-east direction for nearly a mile before we could cross, when, to our joy, we found that it was flowing, not a muddy stream from the effects of recent floods, but a small rivulet of clear water as pure as crystal. The bed of the river at this place is deep and rather narrow: the water flows over sand and pebbles, winding its way between clumps of melaleuca and gum-saplings. After leaving the river we kept our old course, due north, crossing, in a distance of one mile, three creeks with gum-trees on their banks. The soil of the flats through which they flow is a red loam of fair quality and well grassed. Beyond the third creek is a large plain, parts of which are very stony; and this is bounded towards the east by a low stony rise, partly composed of decayed and honeycombed quartz-rock *in situ*, and partly of water-worn pebbles and other alluvial deposits. At about 2 miles across this plain we reached the first of a series of small creeks with deep water-holes. These creeks and holes have the characteristics peculiar to watercourses which are found in flats formed from the alluvial deposits of schistose rocks. The banks are on a level with the surrounding ground, and are irregularly marked by small trees, or only by tufts of long grass which overhang the channel and frequently hide it from one's view, even when within a few yards. At about 5 miles from where we crossed the river we came to the main creek

in these flats—Patten's Creek; it flows along at the foot of a stony range, and we had to trace it up nearly a mile in a N.N.E. direction before we could cross it. As it happened, we might almost as well have followed its course up the flat, for at a little more than 2 miles we came to it again; we re-crossed it at a stony place just below a very large water-hole, and then continued our course over extensive plains, not so well grassed as what we had passed before, and very stony in some places. At 8 miles from Patten's Creek we came to another, running from south-west to south-east. There was plenty of water in it, but it was evidently the result of recent local rains; on the banks was an abundance of good feed, but very little timber.

Friday, Jan. 11.—Started at five A.M., and in the excitement of exploring fine well-watered country forgot all about the eclipse of the sun, until the reduced temperature and peculiarly gloomy appearance of the sky drew our attention to the matter; it was then too late to remedy the deficiency, so we made a good day's journey, the moderation of the midday-heat, which was only about 86° , greatly assisting us. The country traversed has the most verdant and cheerful aspect, abundance of feed and water everywhere. All the creeks seen to-day have a course more or less to the east by south. The land improves in appearance at every mile. A quantity of rain has fallen here and to the south, and some of the flats are suitable for cultivation if the regularity of the seasons will admit.

Cooper's Creek to Carpentaria.—Fieldbook No. 5, Camp 92 to 98; lat. $22\frac{1}{4}^{\circ}$ to $21\frac{1}{4}^{\circ}$. Standish Ranges.

Saturday, Jan. 12.—We started at five A.M., and, keeping as nearly as possible a due north course, traversed for about 8 miles a splendid flat, through which flow several fine well-watered creeks, lined with white gum-trees. We then entered a series of slaty, low sandstone ranges, amongst which were some well-grassed flats and plenty of water in the main gullies. The more stony portions are, however, covered with porcupine-grass, and here and there with mallee. Large ant-hills are very numerous: they vary in height from $2\frac{1}{2}$ to 4 feet. There was a continuous rise perceptible all the way in crossing the ranges, and from the highest portion, which we reached at a distance of about 7 miles, we had a pretty good view of the country towards the north. As far as we could see in the distance, and bearing due north, was a large range, having somewhat the outline of a granite mountain. The east end of this range just comes up to the magnetic north; the left of this, and bearing N.N.W., is a single conical peak, the top of which only is visible. Farther to the west there were some broken ranges,

apparently sandstone; to the east of north the tops of very distant and apparently higher ranges were seen, the outline of which was so indistinct that I can form no idea as to their character. The intermediate country below us appeared alternations of fine valleys and stony ranges, such as we had just been crossing. From here a descent of 2 miles brought us to a creek having a northern course, but, on tracing it down for about a mile, we found it turn to the south-east, and join another from the north. We crossed over to the latter on a north-by-west course, and camped on the west bank. It has a broad sandy channel; the water-holes are large, but not deep; the banks are bordered with fine white gums, and are in some places very scrubby. There is abundance of rich green feed everywhere in the vicinity. We found numerous indications of blacks having been here, but saw nothing of them. It seems remarkable that where their tracks are so plentiful, we should [have seen] none since we left King's Creek. I observed that the natives here climb trees like those on the Murray, &c., in search of some animal corresponding in habits to the opossum, which they get out of the hollow branches in a similar manner. I have not yet been able to ascertain what the animal is.

Sunday, Jan. 13.—We did not leave camp this morning until half-past seven, having delayed for the purpose of getting the camels' shoes on, a matter in which we were eminently unsuccessful. We took our breakfast before starting, for almost the first time since leaving the depôt. Having crossed the creek, our course was due north as before, until at about 6 miles we came in sight of the range ahead, when we took a north half-east direction for the purpose of clearing the eastern front of it. We found the ground more sandy than what we had before crossed, and a great deal of it even more richly grassed. Camp 93 is situated at the junction of three sandy creeks, in which there is abundance of water. The sand is loose, and the water permeates freely, so that the latter may be obtained delightfully cool and clear by sinking anywhere in the beds of the creeks.

Cooper's Creek to Carpentaria.—Fieldbook No. 6; lat. $21\frac{1}{2}^{\circ}$ to $20\frac{1}{2}^{\circ}$. Station 98 to 105, upper part of Cloncurry.

Saturday, January 19, 1861.—Started from Camp 98 at 5:30 A.M., and passing to the north-west of Mount Forbes, across a fine and well-grassed plain, kept at first a north by east direction; at a distance of three miles the plain became everywhere stony, being scattered over with quartz-pebbles, and a little farther on we came to low quartz-ranges, the higher portions of which are covered with porcupine-grass, but the valleys are well clothed with a variety of coarse and rank herbage. At about 5 miles we

crossed a creek with a sandy bed, which has been named Green's Creek. There were blacks not far above where we crossed, but we did not disturb them. After crossing the creek, we took a due north course, over very rugged quartz-ranges of an auriferous character. Pieces of iron ore, very rich, were scattered in great numbers over some of the hills. On our being about to cross one of the branch-creeks in the low range, we surprised some blacks—a man, who, with a young fellow apparently his son, was upon a tree cutting out something, and a lubra with a piccauniny. The two former did not see me until I was nearly close to them, and then they were dreadfully frightened. Jumping down from the trees, they started off shouting what sounded to us very like "Joe, joe!" Thus disturbed, the lubra, who was some distance from them, just then caught sight of the camels and the remainder of the party as they came over the hill into the creek, and this tended to hasten their flight over the stones and porcupine-grass. Crossing the range at the head of this creek, we came on a gully running north, down which we proceeded, and soon found it open out into a creek at two or three points, in which we found water. On this creek we found the first specimen of an eucalyptus, which has a very different appearance from the members of the gum-tree race; it grows as high as a good-sized gum-tree, but with the branches less spreading; in shape it much resembles the elm; the foliage is dark, like that of the lightwood; the trunk and branches are covered with a grey bark, resembling in outward appearance that of the box-tree. Finding that the creek was trending too much to the eastward, we struck off to the north again, and at a short distance came on a fine creek running about s.s.e. As it was now time to camp, we travelled it up for about a mile and a half, and came to a fine water-hole in a rocky basin, at which there were lots of birds.

Cooper's Creek to Carpentaria.—Fieldbook No. 7; lat. $20\frac{1}{4}^{\circ}$ to $19\frac{1}{4}^{\circ}$. Camp 105 to 112, middle part of Cloncurry.

Sunday, Jan. 27, 1861.—Started from Camp 105, five minutes past two in the morning; we followed along the bends of the creek by moonlight, and found the creek wind about very much, taking on the whole a north-east course. At about 5 miles it changed somewhat its features; from a broad and sandy channel, winding about through gum-tree flats, it assumes the unpropitious appearance of a straight narrow creek running in a n.n.e. direction between high perpendicular earthy banks. After running between 3 and 4 miles in this manner, it took a turn to the west, at which point there is a fine water-hole, and then assumed its original character. Below this we found water at several places, but it all seemed to

be either from surface-drainage or from springs in the sand. The land in the vicinity of the creek appears to have received plenty of rain, the vegetation everywhere green and fresh, but there is no appearance of the creek having flowed in this part of the channel for a considerable period. Palm-trees are numerous, and some bear an abundance of small round dates (nuts) just ripening. These palms give a most picturesque and pleasant appearance to the creek.

Wednesday, Jan. 30.—Started at half-past seven A.M. After several unsuccessful attempts at getting Golah out of the bed of the creek, it was determined to try bringing him down until we could find a place for him to get out at; but after going in this way two or three miles, it was found necessary to leave him behind, as it was almost impossible to get him through some of the water-holes, and King had separated from the party, which became a matter for very serious consideration, when we found blacks hiding in the box-trees close to us.

Fieldbook No. 8.—Cooper's Creek to Carpentaria.—Camp 112 to Camp 119. Southern latitude $19\frac{1}{4}^{\circ}$ to $17^{\circ} 53'$, lower part of Cloncurry.

Fieldbook No. 9, returning from Carpentaria to Cooper's Creek.

Sunday, February 3, 1861.—Finding the ground in such a state from the heavy falls of rain that the camels could scarcely be got along, it was decided to leave them at Camp 119, and for Mr. Burke and I to proceed towards the sea on foot. After breakfast we accordingly started, taking with us the horse and three days' provisions. Our first difficulty was in crossing Billy's Creek, which we had to do where it enters the river, a few hundred yards below the camp. In getting the horse in here, he got bogged in a quicksand-bank so deeply as to be unable to stir, and we only succeeded in extricating him by undermining him on the creek side, and then lunging him into the water. Having got all the things in safety, we continued down the river-bank, which bent about from east to west, but kept a general north course. A great deal of the land was so soft and rotten that the horse, with only a saddle and about 25 pounds on his back, could scarcely walk over it. At a distance of about five miles we again had him bogged in crossing a small creek, after which he seemed so weak that we had great doubts about getting him on. We, however, found some better ground close to the water's edge where the sandstone-rock runs out, and we stuck to it as far as possible.

Finding that the river was bending about so much that we were making very little progress in a northerly direction, we struck off due north, and soon came on some tableland where the soil is shallow and gravelly, and clothed with box and swamp-gums. Patches of the land were very boggy, but the main portion was sound enough; beyond this, we came on an open plain covered with water up to one's ankles. The soil here was a stiff clay, and the surface very uneven, so that between the tufts of grass one was frequently knee-deep in water. The bottom, however, was sound, and no fear of bogging. After floundering through this for several miles, we came to a path formed by the blacks, and there were distinct signs of a recent migration in a southerly direction. By making use of this path we got on much better, for the ground was well-trodden and hard. At rather more than a mile the path entered a forest, through which flowed a nice water-course, and we had not gone far before we found places where the blacks had been camping. The forest was intersected by little pebbly rises on which they had made their fires; and in the sandy ground adjoining, some of the former had been digging yams,* which seemed to be so numerous that they could afford to leave lots of them about, probably having only selected the very best. We were not so particular, but ate many of those that they had rejected, and found them very good. About half a mile farther we came close on a black fellow, who was coiling by a camp-fire, whilst his gin and piccaninny were jabbering alongside. We stopped for a short time to take out some of the pistols that were on the horse, and that they might see us before we were so near as to frighten them. Just after we stopped, the black got up to stretch his limbs, and after a few seconds looked in our direction. It was very amusing to see the way in which he stared, standing for some time as if he thought he must be dreaming, and then having signalled to the others, they dropped on their haunches and shuffled off in the quietest manner possible. Near their fire was a fine hut, the best I have ever seen, built on the same principle as those at Cooper's Creek, but much larger and more complete. I should say a dozen blacks might comfortably coil in it together. It is situated at the end of the forest, towards the north, and looks out on an extensive marsh, which is at times flooded by the sea-water. Hundreds of wild geese, plover, and pelicans were enjoying themselves in the water-courses on the marsh; all the water on which was too brackish to be drinkable, except some holes that are filled by the stream that flows through the forest. The neighbourhood of this encampment is one of the prettiest we have seen during the journey. Proceeding on our course across the marsh,

* The *Dioscorea* of Carpentaria.

we came to a channel through which the sea-water enters. Here we passed three blacks, who, as is universally their custom, pointed out to us, unasked, the best part down. This assisted us greatly, for the ground we were taking was very boggy. We moved slowly down, about three miles, and then camped for the night. The horse, Billy, being completely baked, next morning we started at daybreak, leaving him short-hobbled.

5th Nov., 1861.

Memo.—Verbally transcribed from the fieldbooks of the late Mr. Wills. Very few words, casually omitted in the author's manuscript, have been added in brackets. A few botanical explanations have been appended. A few separate general remarks referring to this portion of the diary will be published, together with the meteorological notes to which they are contiguous. No other notes in reference to this portion of the journey are extant.

FRED. MUELLER.

MR. WILLS'S *Journal of the Return from Carpentaria to Cooper's Creek.*

(Transcribed by Mr. James Smith.)

Tuesday, February 19, 1861, Boocha's Camp.

Wednesday, Feb. 20, Pleasant Camp, 5 R.

Thursday, Feb. 21, Recovery Camp, 6 R.—Between four and five o'clock a heavy thunderstorm broke over us, having given very little warning of its approach. There had been lightning and thunder towards the south-east and south ever since noon yesterday. The rain was incessant and very heavy for an hour and a half, which made the ground so boggy that the animals could scarcely walk over it. We nevertheless started at ten minutes to seven A.M., and, after floundering along for half an hour, halted for breakfast. We then moved on again, but soon found that the travelling was too heavy for the camels, so camped for the remainder of the day. In the afternoon the sky cleared a little, and the sun soon dried the ground, considering. Shot a pheasant, and much disappointed at finding him all feathers and claws. This bird nearly resembles a cock-pheasant in plumage, but in other respects it bears more the character of the magpie or crow: the feathers are remarkably wiry and coarse.

Friday, Feb. 22, Camp 7 R.—A fearful thunderstorm in the evening, about eight P.M., E.S.E., moving gradually round to south. The flashes of lightning were so vivid and incessant as to keep up a continual light for short intervals, overpowering even the moonlight. Heavy rain and strong squalls continued for more than an hour, when the storm moved off W.N.W.; the sky re-

maintained more or less overcast for the rest of the night, and the following morning was both sultry and oppressive, with the ground so boggy as to be almost impassable.

Saturday, Feb. 23, Camp 8 R.—In spite of the difficulties thrown in our way by last night's storm, we crossed the creek. We were shortly afterwards compelled to halt for the day, on a small patch of comparatively dry ground near the river. The day turned out very fine, so that the soil dried rapidly; and we started in the evening to try a trip by moonlight. We were very fortunate in finding sound ground along a billibong, which permitted of our travelling for about five miles up the creek, when we camped for the night. The evening was most oppressively hot and sultry—so much so, that the slightest exertion made one feel as if he were in a state of suffocation. The dampness of the atmosphere prevented any evaporation, and gave one a helpless feeling of lassitude that I have never before experienced to such an extent. All the party complained of the same sensations, and the horses showed distinctly the effect of the evening trip, short as it was. We had scarcely turned in half an hour when it began to rain, some heavy clouds having come up from the eastward, in place of the layer of small *cirro cumuli* that before ornamented the greater portion of the sky. These clouds soon moved on, and we were relieved from the dread of additional mud. After the sky cleared, the atmosphere became rather cooler and less sultry; so that, with the assistance of a little smoke to keep the mosquitoes off, we managed to pass a tolerable night.

Sunday, Feb. 24, Camp 9 R.—Comparatively little rain has fallen above the branch-creek with the running water. The vegetation, although tolerably fresh, is not so rank as that we have left. The water in the creek is muddy but good, and has been derived merely from the surface-drainage of the adjoining plains. The *Melaleuca* continues in this branch-creek, which creeps along the foot of the ranges.

Monday, Feb. 25, Camp 10 R.—There has been very little rain on this portion of the creek since we passed down. There was, however, no water at all there, at this point. At the Tea-tree Spring, a short distance up the creek, we found plenty of water in the sand, but it had a disagreeable taste from the decomposition of leaves and the presence of mineral matter—probably iron. There seems to have been a fair share of rain along here, everything is so very fresh and green; and there is water in many of the channels we have [crossed].

Tuesday, Feb. 26, Apple-tree Camp, 11 R.

Thursday, Feb. 28, Reedy Gully Camp, 12 R.—Came into the Reedy Gully Camp about midnight on Tuesday, the 26th.

Remained there throughout the day on Wednesday, starting at 2 A.M. on Thursday.

Friday, March 1, Camp of the Three Crows, 13 R.

Saturday, March 2, Salt-bush Camp, 14 R.—Found Golah. He looks thin and miserable. Seems to have fretted a great deal, probably at finding himself left behind; and he has been walking up and down the tracks till he has made a regular pathway. Could find no sign of his having been far off it, although there is splendid feed, to which he could have gone. He began to eat as soon as he saw the other camels.

Sunday, March 3, Eureka Camp, 15 R.—In crossing a creek by moonlight, Charley rode over a large snake. He did not touch him, and we thought it was a log until he struck it with the stirrup-iron. We then saw that it was an immense snake, larger than any that I have ever before seen in a wild state. It measured 8 feet 4 inches in length, and 7 inches in girth round the belly. It was nearly the same thickness from the head to within 20 inches of the tail; it then tapered rapidly. The weight was 11½ lbs. From the tip of the nose to five inches back the neck was black, both above and behind; throughout the rest of the body the under part was yellow, and the sides and back had irregular brown transverse bars on a yellowish-brown ground. I could detect no poisonous fangs, but there were two distinct rows of teeth in each jaw, and two small claws or nails, about three-eighths of an inch long, one on each side of the vent.

Monday, March 4, Feasting Camp, 16 R.—Shortly after arriving at Camp 16, we could frequently hear distant thunder towards the east, from which quarter the wind was blowing. During the afternoon there were frequent heavy showers, and towards evening it set in to rain steadily, but lightly. This lasted until about eight P.M., when the rain ceased, and the wind got round to west: the sky, however, remained overcast until late in the night, and then cleared for a short time; the clouds were soon succeeded by a dense fog, or mist, which continued until morning. The vapour having then risen, occupied the upper air in the form of light cir-stratus and cumuli clouds.

Tuesday, March 5, Camp 17 R.—Started at two A.M. on a s.s.w. course, but had soon to turn in on the creek, as Mr. Burke felt very unwell, having been attacked by dysentery since eating the snake. He now felt giddy, and unable to keep his seat. At six A.M., Mr. Burke feeling better, we started again, following along the creek, in which there was considerably more water than when we passed down. We camped at 2.15 P.M., at a part of the creek where the date-trees* were very numerous, and found the fruit

* Probably *Licistoxus*.

nearly ripe, and very much improved on what it was when we were here before.

Wednesday, March 6, Camp 18 R.—Arrived at the former camp; and find the feed richer than ever, and the ants just as troublesome. Mr. Burke is a little better, and Charley looks comparatively well. The dryness of the atmosphere seems to have a beneficial effect on all. We found, yesterday, that it was a hopeless matter about Golah, and we were obliged to leave him behind, as he seemed to be completely done up, and could not come on, even when the pack and saddle were taken off.

Thursday, March 7, Fig-tree Camp, 19 R.—Palm-tree Camp, No. 104, and 20° latitude; by observation coming down, 20° 21' 40". There is less water here than there was when we passed down, although there is evidence of the creek having been visited by considerable floods during the interval. Feed is abundant, and the vegetation more fresh than before. Mr. Burke almost recovered; but Charley is again very unwell, and unfit to do anything. He caught cold last night through carelessness in covering himself.

Friday, March 8, Camp 20 R.—Followed the creek more closely coming up than going down. Found more water in it generally.

Saturday, March 9, Camp 21 R.—Reached our former camp at 1:30 P.M. Found the herbage much dried up, but still plenty of feed for the camels.

Sunday, March 10, Camp 22 R.—Camped at the junction of a small creek from the westward, a short distance below our former camp, there being plenty of good water here; whereas the supply at Specimen Camp is very doubtful.

Monday, March 11, Camp 23 R.—Halted for breakfast at the Specimen Camp at 7:15 A.M. Found more water and feed there than before. Then proceeded up the creek, and got safely over the most dangerous part of our journey. Camped near the head of the gap, in a flat about two miles below our former camp at the gap.

Tuesday, March 12, Camp 24 R.

Wednesday, March 13, Camp 25 R.—Rain all day, so heavily that I was obliged to put my watch and fieldbook in the pack, to keep them dry. In the afternoon the rain increased, and all the creeks became flooded. We took shelter under some fallen rocks, near which was some feed for the camels, but the latter was of no value, for we had soon to remove them up amongst the rocks, out of the way of the flood, which fortunately did not rise high enough to drive us out of the cave; but we were obliged to shift our packs to the upper part. In the evening the water fell

as rapidly as it had risen, leaving everything in a very boggy state. There were frequent light showers during the night.

Thursday, March 14, Camp 26 R, Sandstone Cave.—The water in the creek having fallen sufficiently low, we crossed over from the cave, and proceeded down the creek. Our progress was slow, as it was necessary to keep on the stony ridge instead of following the flats, the latter being very boggy after the rain. Thinking that the creek must join Scratchley's near our old camp, we followed it a long way, until, finding it trend altogether too much eastward, we tried to shape across for the other creek; but were unable to do so, from the boggy nature of the intervening plain.

Friday, March 15, Camp 27 R.

Saturday, March 16, Camp 28 R, Scratchley's Creek.

Sunday, March 17, Camp 29 R.

Monday, March 18, Camp 30 R.

Tuesday, March 19, Camp 31 R.

Wednesday, March 20, Camp 32 R, Feasting Camp.—Last evening the sky was clouded about nine p.m., and a shower came down from the north. At ten o'clock it became so dark that we camped on the bank of the creek, in which was a nice current of clear water. To-day we halted, intending to try a night-journey. The packs we overhauled, and left nearly 60 lbs. weight of things behind. They were all suspended in a pack from the branches of a shrub close to the creek. We started at a quarter to six, but were continually pulled up by billibongs and branch-creeks, and soon had to camp for the night. At the junction of the two creeks just above [are] the three cones, which are three remarkable small hills to the eastward.

Thursday, March 21, Humid Camp, 33 R.—Unable to proceed on account of the slippery and boggy state of the ground. The rain has fallen very heavily here to-day, and every little depression in the ground is either full of water or covered with slimy mud. Another heavy storm passed over during the night, almost [extinguishing] the miserable fire we were able to get up with our very limited quantity of water-logged and green wood. Having been so unfortunate last night, we took an early breakfast this morning at Camp 33, which I have named the Humid Camp, from the state of dampness in which we found everything there; and crossing to the east bank of the main creek, proceeded in a southerly direction nearly parallel with the creek. Some of the flats near the creek contain the richest alluvial soil, and are clothed with luxuriant vegetation. There is an immense extent of plain back, of the finest character for pastoral purposes, and the country bears every appearance of being permanently well watered.

We halted on a large billibong at noon, and were favoured during dinner by a thunderstorm, the heavier portion of which missed us, some passing north and some south, which was fortunate, as it would otherwise have spoiled our baking process, a matter of some importance just now. We started again at seven o'clock, but the effects of the heavy rain prevented our making a good journey.

Friday, March 22, Muddy Camp, 34 R.—Had an early breakfast this morning, and started before sunrise. Found that the wet swampy ground that checked our progress last night was only a narrow strip, and that had we gone a little farther we might have made a fine journey. The country consisted of open, well-grassed, pebbly plains, intersected by numerous small channels, all containing water. Abundance of fine rich *portulaca* was just bursting into flower along all these channels, as well as on the greater portion of the plain. The creek that we camped on last night ran nearly parallel with us throughout this stage. We should have crossed it to avoid the stony plains, but were prevented by the flood from so doing.

Saturday, March 23, Mosquito Camp, 35 R.—Started at a quarter to six, and followed down the creek, which has much of the characteristic appearance of the river Burke where we crossed it on our up-journey. The land in the vicinity greatly improves as one goes down, becoming less stony and better grassed. At eleven o'clock we crossed a small tributary from the eastward, and there was a distant range of considerable extent visible in that direction. Halted for the afternoon in a bend, where there was tolerable feed, for the banks are everywhere more or less scrubby.

Sunday, March 24, Three-hour Camp, 36 R.

Monday, March 25, Native-Dog Camp, 37 R.—Started at half-past five, looking for a good place to halt for the day. This we found at a short distance down the creek, and immediately discovered that it was close to Camp 89 of our up-journey. Had not expected that we were so much to the westward. After breakfast, took some time-altitudes, and was about to go back to last camp for some things that had been left, when I found Grey behind a tree, eating skillogalee. He explained that he was suffering from dysentery, and had taken the flour without leave. Sent him to report himself to Mr. Burke, and went on. He having got King to tell Mr. Burke for him, was called up, and received a good thrashing. There is no knowing to what extent he has been robbing us. Many things have been found to run unaccountably short. Started at seven o'clock, the camels in first-rate spirits. We followed our old course back (south). The first portion of the plains had much the same appearance as when we came up; but that near Camp 88, which then looked so fresh and green, is now very much dried up, and we saw no signs of water anywhere.

In fact there seems to have been little or no rain about here since we passed. Soon after three o'clock we struck the first of several small creeks or billibongs, which must be portions of the creek with the deep channel that we crossed on going up, we being now rather to the westward of our former course. From here, after traversing about 2 miles of the barest clay-plain, devoid of all vegetation, we reached a small water-course, most of the holes in which contained some water of a milky or creamy description. Fine salt-bush and portulac being abundant in the vicinity, we camped here at 4:30 A.M. When we started in the evening, a strong breeze had already sprung up in the south, which conveyed much of the characteristic feeling of a hot wind. It increased gradually to a force of five and six, but by eleven o'clock had become decidedly cool, and was so chilly towards morning that we found it necessary to throw on our ponchos. A few cir. cum. clouds were coming up from the east when we started, but we left them behind, and nothing was visible during the night but a thin hazy veil. The gale continued throughout the 26th, becoming warmer as the day advanced. In the afternoon it blew furiously, raising a good deal of dust. The temperature of air at four P.M. was 94° in the shade. Wind trees all day.

Tuesday, March 26, Salt-bush Camp, 38 R.

Wednesday, March 27, Camp 39 R.

Thursday, March 28, Camp 40 R.

Friday, March 29, Camp 41 R.—Camels' last feast. Fine green feed at this camp. Plenty of vine and young polygonums on the small billibongs.

Saturday, March 30, Camp 42 R, Boocha's Rest.—Employed all day in cutting up, jerking, and eating Boocha. The day turned out as favourable for us as we could have wished, and a considerable portion of the meat was completely jerked before sunset.

Sunday, March 31, Camp 43 R, Mia-Mia Camp.—Plenty of good dry feed, various shrubs, salt-bushes, including cotton-bush and some coarse kangaroo-grass; water in the hollows on the stony pavement. The neighbouring country chiefly composed of stony rises and sand-ridges.

Monday, April 1, Camp 43 R.

Tuesday, April 2, Camp 44 R.—Thermometer broken.

Wednesday, April 3, Camp 45 R, Salt-Meat Camp.

Thursday, April 4, Camp 46 R, The Plant Camp.

Friday, April 5, Camp 47 R, Oil Camp.—Earthy and clayey plains, generally sound and tolerably grassed; but in other places bare salt-bush, withered.

Saturday, April 6, Wild-Duck Camp, 48 R.—Earthy flats, cut into innumerable watercourses [succeeded by] fine open plains, generally very bare, but having in some places patches of fine salt-

bush. The dead stalks of portulac and mallows show that those plants are very plentiful in some seasons. [Towards noon came upon] earthy plains and numerous billibongs.

Sunday, April 7, Camp 49 R.—Find the water and feed much dried up. Nearly all the water we have met with has a slightly brackish taste of a peculiar kind, somewhat resembling in flavour potassio tartrate of soda.

Monday, April 8, Camp 50 R.—Camped a short distance above Camp 75. The creek here contains more water, and there is a considerable quantity of green grass in its bed, but it is much dried up since we passed before. Halted 15 minutes to send back for Gray, who gammoned he could not walk. Some good showers must have fallen lately, as we have passed surface-water on the plains every day. In the latter portion of to-day's journey the young grass and portulac are springing freshly in the flats and on the sides of the sand-ridges.

Tuesday, April 9, Camp 51 R.—Camped on the bank of the creek, where there is a regular field of salt-bush, as well as some grass in its bed, very acceptable to the horse, who has not had a proper feed for the last week until last night, and is, consequently, nearly knocked up.

Wednesday, April 10, Camp 52 R.—Remained at Camp 52 R all day to cut up and jerk the meat of the horse Billy, who was so reduced and knocked up for want of food, that there appeared little chance of his reaching the other side of the desert; and, as we were running short of food of every description ourselves, we thought it best to secure his flesh at once. We found it healthy and tender, but without the slightest trace of fat in any portion of the body.

Thursday, April 11.—Plenty of water in creek down to this point.

Friday, April 12.—Extensive earthy plains, intersected by numerous watercourses.

Saturday, April 13.—Small watercourses lined with lakes. Plenty of salt-bush and chrysanthemums on either side. Camped on Stony Desert.

[NOTE BY TRANSCRIBER.—Up to this point, as it appears from Mr. Wills's Fieldbook, the Expedition never passed a day in which they did not traverse the banks of, or cross, a creek or other watercourse.]

Sunday, April 14.

Monday, April 15.—It commenced to rain lightly at five A.M. this morning, and continued raining pretty steadily throughout the day. Owing to the wet and the exertion of crossing the numerous sand-ridges, Linda became knocked up about four o'clock, and we

had to halt at a claypan amongst the sandhills. [The party seems to have crossed a creek near a native camp, about ten A.M.]

Tuesday, April 16.

Wednesday, April 17.—This morning, about sunrise, Gray died. He had not spoken a word distinctly since his first attack, which was just as we were about to start.

Thursday, April 18.—[Another creek and native camp were passed.]

Friday, April 19.—Camped again without water on the sandy bed of the creek, having been followed by a lot of natives who were desirous of our company; but as we preferred camping alone, we were compelled to move on until rather late, in order to get away from them. The night was very cold. A strong breeze was blowing from the south, which made the fire so irregular, that, as on the two previous nights, it was impossible to keep up a fair temperature. Our general course throughout the day had been S.S.E.

Saturday, April 20.

Sunday, April 21.—Arrived at the depôt this evening just in time to find it deserted. A note left in the plant by Brahé communicates the pleasing information that they have started to-day for the Darling; their camels and horses all well and in good condition; we and our camels being just done up, and scarcely able to reach the depôt, have very little chance of overtaking them. Brahé has fortunately left us ample provisions to take us to the bounds of civilisation, namely:—flour, 50 lbs.; rice, 20 lbs.; oatmeal, 60 lbs.; sugar, 60 lbs.; and dried meat, 15 lbs. These provisions, together with a few horse-shoes and nails, and some castaway odds and ends, constitute all the articles left, and place us in a very awkward position in respect to clothing. Our disappointment at finding the depôt deserted may easily be imagined;—returning in an exhausted state, after four months of the severest travelling and privation, our legs almost paralysed, so that each of us found it a most trying task only to walk a few yards. Such a leg-bound feeling I never before experienced, and hope I never shall again. The exertion required to get up a slight piece of rising ground, even without any load, induces an indescribable sensation of pain and helplessness, and the general lassitude makes one unfit for anything. Poor Gray must have suffered very much, many times when we thought him shamming. It is most fortunate for us that these symptoms, which so early affected him, did not come on us until we were reduced to an exclusively animal diet of such an inferior description as that offered by the flesh of a worn-out and exhausted horse. We were not long in getting out the grub that Brahé had left, and we made a good supper off some

oatmeal-porridge and sugar. This, together with the excitement of finding ourselves in such a peculiar and almost unexpected position, had a wonderful effect in removing the stiffness from our legs. Whether it is possible that the vegetables can so have affected us, I know not; but both Mr. B. and I remarked a most decided relief and a strength in the legs greater than we had had for several days. I am inclined to think that but for the abundance of portulac that we obtained on the journey, we should scarcely have returned to Cooper's Creek at [all].

BURKE'S Notes of the Expedition.

These notes were often illegible, and in many places the pages of the book had been ripped and cut out. The book was evidently kept for rough memoranda.

The following extracts are from the memorandum-book of Mr. Burke. Mr. Archer, to whom the task of transcribing it was entrusted, writes the following preface:—"I went carefully through Burke's note-book last night. It is an ordinary memorandum-book, with a clasp, and a side pocket for a pencil. It is much dilapidated, and several of the leaves are torn out. Some so torn had been written on. I have numbered these consecutively throughout. The following is a copy, letter for letter, and word for word, of all that remains of Burke's pencillings. I have queried all doubtful points."

No. 69 line of cour i ng on bags, 1, 4, 19, 20, 11, 3. Think well before giving an answer, and never speak except from strong convictions.

Dec. 16, 1860.—Left Depôt 65, followed by the creek.

Dec. 17.—The same, 66.

Dec. 18.—The same, 67.

Dec. 19.—We made a (?) small creek, supposed to be Otta Era (?), or in the immediate neighbourhood of it. Good water, Camp 69.

Dec. 20.—Made a creek where we found a great many natives—they presented us with fish and offered their women, Camp 70.

Dec. 21.—Made another creek, Camp 71. Splendid water, fine feed for the camels; would be a very good place for a station. Since we have left Cooper's Creek we have travelled over a very fine sheep-grazing country, well watered, and in every respect well suited for occupation.

Dec. 22, Camp 72.—Encamped on the borders of the desert.

Dec. 23.—Travelled day and night, and encamped in the night in the bed of a creek, as we supposed we were near water.

Dec. 24.—Encamped on the morning of this day on the banks of Gray's Creek, called after him because he was detached on

horseback from the party, and found it good water. The third day without it. Now for a retrospective glance. We started from Cooper's Creek, Camp 66, with the intention of going through to Eyre's Creek without water. Loaded with 800 pints of water, four riding-camels carried 130 pints, each horse 150, two pack-camels 50 each, and 5 pints each man.

Dec. 25, Christmas-day.—Started at four A.M. from Gray's Creek, and arrived at a creek which appears to be quite as large as Cooper's Creek. At two P.M. Golah-Sing gave some very decided hints about stopping by lying down under the trees; splendid prospect.

Dec. 26, Dec. 27, Dec. 28, Dec. 29, followed up the creek until it took a turn to the south-east, which I thought rather too much to put up with, therefore left it on the morning of the 30th December, 12.30, on the road—started at seven o'clock, travelled eleven hours. 31st, started at 2.20, sixteen and a-half hours on the road, travelled thirteen and a half hours.

Jan. 1, 1861.—Water.

Jan. 2, from King's Creek.—Eleven hours on the road. Started at seven, travelled nine and a half hours; desert.

Jan. 3.—Five started, travelled twelve hours no minutes.

Jan. 4.—Twelve hours on the road.

Jan. 5.—Water at Wills' or King's Creek. It is impossible to say the time we were up, for we had to load the camels, to pack and feed them, to watch them and the horse, and to look for water, but I am satisfied that the frame of man never was more severely taxed. [Here follows an entry for March 28th, commencing thus, "March 28th—At the conclusion of" then some of the leaves appear to have been torn out from pages 43 to 55.]

Jan. 13, 1861.—As I find it impossible to keep a regular diary, I shall jot down my ideas when I have an opportunity and put the date. Upon two occasions, at Cooper's Creek and at King's Creek, on New Year's Day, whenever the natives tried to bully or bounce us and were repulsed, although the leaders appeared to be in earnest, the followers and particularly the young ones laughed heartily and seemed to be amused at their leaders' repulse. The old fellow at King's Creek who stuck his spear into the ground and threw dust in the air, when I fired off my pistol, ran off in the most undignified manner. Names for places:—Thackeray, Barry, Bindon, Lyons, Forbes, Archer, Bennet, Colles, O. S. Nicholson, Wood, Wrixon, Cope, Turner, Scratchley, Ligar, Griffith, Green, Roe, Hamilton, Colles.

Jan. 18.—Still on the ranges, the camels sweating profusely from fear.

Jan. 20.—I determined to-day to go straight at the ranges, and so far the experiment has succeeded well. The poor camels

sweating and groaning, but we gave them a hot bath in Turner's Creek, which seemed to relieve them very much. At last through—the camels bleeding, sweating, and groaning. [Leaves 35 to 39 torn out, and eight leaves preceding torn out, no marks of writing visible on the remnant. Leaves 24 to 33, both inclusive, blank on both sides.]

March 28.—At the conclusion of report, it would be well to say that we reached the sea, but we could not obtain a view of the open ocean, although we made every endeavour to do so.

Leaving Carpentaria—Flour, 83 lbs.; pork, 3 lbs.; D. meat, 35 lbs.; biscuits, 12 lbs.; rice, 12 lbs.; sugar, 10 lbs. [Page 15 blank.]—Return party from Carpentaria arrived here last night, and found that the D. party had started on the same day. We proceed slowly down the creek towards Adelaide by Mount Hopeless, and shall endeavour to follow Gregory's track, but we are very weak, the camels are done up, and we shall not be able to travel faster than 5 miles a day at most. Gray died on the road from hunger and fatigue. We all suffered much from hunger, but the provisions left here will, I think, restore our strength. We have discovered a practicable route to Carpentaria, the principal portion of which lies in the 140th meridian of east longitude. Between this and the Stony Desert there is some good country; to the tropic the country is dry and stony; between the tropic and Carpentaria a considerable portion is rangy, but it is well watered and richly grassed.

[Pages 20 and 21 torn, no writing apparent.

Pages 22 and 23 contain a memorandum of stores, but without any particular reference to time and place.]

Journal of Trip from Cooper's Creek towards Adelaide, April, 1861.

(Transcribed by Mr. Archer.)

The advance party of the Victorian Exploring Expedition, consisting of Burke, Wills, and King (Gray being dead), having returned from Carpentaria on the 21st April in an exhausted and weak state, and finding that the dépôt party left at Cooper's Creek had started for the Darling, with their horses and camels fresh and in good condition, deemed it useless to attempt to overtake them, having only two camels, both done up, and being so weak themselves as to be unable to walk more than 4 or 5 miles a day; finding also that the provisions left at the dépôt for them would scarcely take them to Menindie, started down Cooper's Creek for Adelaide, *via* Mount Hopeless, on the morning of the 23rd April, intending to follow as nearly as possible the route taken by

Gregory; by so doing they hope to be able to recruit themselves and the camels whilst sauntering slowly down the creek, and to have sufficient provisions left to take them comfortably, or at least without risk, to some station in South Australia. Their equipment consists of the following articles:—flour, 50 lbs.; sugar, 60 lbs.; rice, 20 lbs.; oatmeal, 60 lbs.; jerked meat, 25 lbs.; ginger, 2 lbs.; salt, 1 lb.

[Then follow some native words, with their meanings.]

Tuesday, April 23, from Dépôt.—Having collected together all the odds and ends that seemed likely to be of use to us, in addition to provisions left in the plant, we started at a quarter past nine A.M., keeping down the southern bank of the creek. We only went about 5 miles, and camped at half-past eleven on a billibong, where the feed was pretty good. We find the change of diet already making a great improvement in our spirits and strength. The weather is delightful, days agreeably warm, but the nights very chilly. The latter is more noticeable from our deficiency in clothing, the dépôt party having taken all the reserve things back with them to the Darling. To Camp 1.

Wednesday, April 24, from Camp 1.—As we were about to start this morning some blacks came by, from whom we were fortunate enough to get 12 lbs. of fish for a few pieces of straps and some matches, &c. This is a great treat for us, as well as a valuable addition to our rations. We started at a quarter past eight P.M., on our way down the creek, the blacks going in the opposite direction, little thinking that in a few miles they would be able to get lots of pieces for nothing, better than those they had obtained from us. To Camp 2.

Thursday, April 25, from Camp 2.—Awoke at five o'clock, after a most refreshing night's rest. The sky was beautifully clear, and the air rather chilly. The terrestrial radiation seems to have been considerable, and a slight dew had fallen. We had scarcely finished breakfast when our friends the blacks, from whom we obtained the fish, made their appearance with a few more, and seemed inclined to go with us and keep up the supply. We gave them some sugar, with which they were greatly pleased. They are by far the most well-behaved blacks we have seen on Cooper's Creek. We did not get away from the camp until half-past nine A.M., continuing our course down the most southern branch of the creek, which keeps a general south-west course. We passed across the stony point which abuts on one of the largest water-holes in the creek, and camped at half-past twelve about a mile below the most dangerous part of the rocky path. At this latter place we had an accident, that might have resulted badly for us. One of the camels fell while crossing the worst part, but we fortunately got him out with only a few cuts and bruises. The water-hole at this

camp is a very fine one, being (to Camp 3) several miles long, and on an average about * chains broad. The waterfowl are numerous, but rather shy—not nearly so much so, however, as those on the creeks between here and Carpentaria; and I am convinced that the shyness of the latter, which was also remarked by Sturt, on his trip to Eyre's Creek, arises entirely from the scarcity of animals, both human and otherwise, and not from any peculiar mode of catching them that the blacks may have.

Friday, April 26, from Camp 3.—Last night was beautifully calm, and comparatively warm, although the sky was very clear. Reloaded the camels by moonlight this morning, and started at a quarter to six. Striking off to the south of the creek, we soon got on a native path, which leaves the creek just below the stony ground, and takes a course nearly west across a piece of open country, bounded on the south by sand-ridges, and on the north by the scrubby ground which flanks the bank of the creek at this part of its course. Leaving the path on the right at a distance of 3 miles, we turned up a small creek which passes down between some sand-hills; and, finding a nice patch of feed for the camels at a water-hole, we halted at fifteen minutes past seven for breakfast. We started again at fifty minutes past nine A.M. Continuing our westerly course along the path, we crossed to the south of the watercourse above the water, and proceeded over the most splendid salt-bush country that one could wish to see, bounded on the left by sandhills, whilst to the right the peculiar looking flat-topped sandstone ranges form an extensive amphitheatre, through the far side of the arena of which may be traced the dark line of creek-timber. At twelve o'clock we camped in the bed of the creek, at Camp,* our last camp on the road down from the Gulf, having taken four days to do what we then did in one. This comparative rest and the change in diet have also worked wonders, however; the leg-tied feeling is now entirely gone, and I believe that in less than a week we shall be fit to undergo any fatigue whatever. The camels are improving, and seem capable of doing all that we are likely to require of them. To Camp 4.

Saturday, April 27.—First part of night clear, with a light breeze from south. Temperature at midnight, 10° (Réaumur); towards morning there were a few cir. cum. clouds passing over north-east to south-west, but these disappeared before daylight; at five A.M. the temperature was 7.5° (Réaumur). We started at six o'clock, and, following the native path—which at about a mile from our camp takes a southerly direction—we soon came to the high sandy alluvial deposit, which separates the creek at this point from the stony rises. Here we struck off from the path, keeping

* Blank in ms. corrected, read of as above.

well to the south of the creek, in order that we might mess in a branch of it that took a southerly direction. At twenty minutes past nine we came in on the creek again where it runs due south, and halted for breakfast at a fine water-hole, with fine fresh feed for the camels. Here we remained until noon, when we moved on again, and camped at one o'clock on a general course, having been throughout the morning south-west 8 miles. The weather is most agreeable and pleasant; nothing could be more favourable to us up to the present time. The temperature in the shade at half-past ten A.M. was 17.5° (Réaumur), with a light breeze from south, and a few small cir-cum. clouds towards the north. I greatly feel the want of more instruments, the only things I have left being my watch, prism-compass, pocket-compass, and one thermometer (Réaumur). To Camp 5.

Sunday, April 28, from Camp 5.—Morning fine and calm, but rather chilly. Started at a quarter to five A.M., following down the bed of a creek in a westerly direction, by moonlight. Our stage was, however, very short; for about a mile one of the camels (Linda) got bogged by the side of a water-hole, and although we tried every means in our power, we found it impossible to get him out. All the ground beneath the surface was a bottomless quicksand, through which the beast sank too rapidly for us to get bushes or timber fairly beneath him; and, being of a very sluggish, stupid nature, he could never be got to make sufficiently strenuous efforts towards extricating himself. In the evening, as a last chance, we let the water in from the creek, so as to buoy him up, and at the same time soften the ground about his legs; but it was of no avail. The brute lay quietly in it, as if he quite enjoyed his position. To Camp 6.

Monday, April 29, from Camp 6.—Finding Linda still in the hole, we made a few attempts at extricating him, and then shot him, and after breakfast commenced cutting off what flesh we could get at for jerking.

Tuesday, April 30, Camp 6.—Remained here to-day, for the purpose of drying the meat, for which process the weather is not very favourable. [Meteorological note follows.]

Wednesday, May 1, from Camp 6.—Started at twenty minutes to nine, having loaded our only camel, Rajah, with the most necessary and useful articles, and packed up a small swag each of bedding and clothing for our own shoulders. We kept on the right bank of the creek for about a mile, and then crossed over at a native camp to the left, where we got on a path running due west, the creek having turned to the north. Following the path, we crossed an open plain, and then sand-ridges, whence we saw the creek straight ahead of us, running nearly south again. The path took us to the southernmost point of the bend, in a distance of

about $2\frac{1}{2}$ miles from where we had crossed the creek; thereby saving us from 3 to 4 miles, as it cannot be less than 6 miles round by the creek. To Camp 7.

Thursday, May 2, Camp 7.—Breakfasted by moonlight, and started at half-past six. Following down the left bank of the creek in a westerly direction, we came, at a distance of 6 miles, on a lot of natives, who were camped on the bed of a creek. They seemed to have just breakfasted, and were most liberal in the presentations of fish and cake. We could only return the compliment by some fish-hooks and sugar. About a mile farther on we came to a separation of the creek, where what looked like the main branch looked towards the south. This channel we followed; not, however, without some misgivings as to its character, which were soon increased by the small and unfavourable appearance that the creek assumed. On our continuing along it a little farther it began to improve, and widened out with fine water-holes of considerable depth. The banks were very steep, and a belt of scrub lined it on either side. This made it very inconvenient for travelling, especially as the bed of the creek was full of water for a considerable distance. At eleven A.M. we halted until half-past one P.M., and then moved on again, taking a S.S.W. course for about 2 miles; when, at the end of a very long water-hole, it breaks into billibongs, which continue splitting into sandy channels until they are all lost in the earthy soil of a box-forest. Seeing little chance of water ahead, we turned back to the end of the long water-hole, and camped for the night. On our way back Rajah showed signs of being done up. He had been trembling greatly all the morning. On this account his load was further lightened to the amount of a few pounds, by doing away with the sugar, ginger, tea, cocoa, and two or three tin plates. To Camp 8.

Friday, May 3, Camp 8.—Started at 7 A.M., striking off in a northerly direction for the main creek. At $1\frac{1}{2}$ mile came to a branch which [left unfinished.] To Camp 9.

Saturday, May 4, Junction from Camp 9.—Night and morning very cold. Sky clear, almost calm; occasionally a light breath of air from south. Rajah appears to feel the cold very much. He was so stiff this morning as to be scarcely able to get up with his load. Started to return down the creek at 6.45, and halted for breakfast at 9 A.M., at the same spot as we breakfasted at yesterday. Proceeding from there down the creek, we soon found a repetition of the features that were exhibited by the creek examined on Thursday. At $1\frac{1}{2}$ mile we came to the last water-hole, and below that the channel became more sandy and shallow, and continued to send off billibongs to the south and west, slightly changing its course each time, until it disappeared altogether in a north-westerly direction. Leaving King with the camel, we went

on a mile or two to see if we could find water; and, being unsuccessful, we were obliged to return to where we had breakfasted, as being the best place for feed and water.

Sunday, May 5, to Camp 10.—Started by myself to reconnoitre the country in a southerly direction, leaving Mr. Burke and King with the camel at Camp 10. Travelled south-west by south for two hours, following the course of the most southerly billibongs. Found the earthy soil becoming more loose and cracked up, and the box-track gradually disappearing. Changed course to west, for a high sand-ridge, which I reached in one hour and a half; and, continuing in the same direction to one still higher, obtained from it a good view of the surrounding country. To the north were the extensive box-forests, bounding the creek on either side; to the east, earthy plains, intersected by watercourses and lines of timber, and bounded in the distance by sand-ridges; to the south, the projection of the sand-ridge partially intercepted the view; the rest was composed of earthy plains, apparently clothed with chrysanthemums; to the westward, another but smaller plain was bounded also by high sand-ridges, running parallel with the one on which I was standing. This dreary prospect offering no encouragement for one to proceed, I returned to Camp 10 by a more direct and better route than I had come, passing over some good salt-bush land which borders on the billibongs to the westward. [Here follow some meteorological notes.]

Monday, May 6, from Camp 10 back to Camp 9.—Moved up the creek again to Camp 9, at the junction, to breakfast, and remained the day there. The present state of things is not calculated to raise our spirits much. The rations are rapidly diminishing; our clothing, especially the boots, are all going to pieces, and we have not the materials for repairing them properly. The camel is completely done up, and can scarcely get along, although he has the best of feed, and is resting half his time. I suppose this will end in our having to live like the blacks for a few months.

Tuesday, May 7, Camp 9.—Breakfasted at daylight; but when about to start, found that the camel would not rise, even without any load on his back. After making every attempt to get him up, we were obliged to leave him to himself. Mr. Burke and I started down the creek to reconnoitre. At about 11 miles we came to some blacks fishing. They gave us some half-a-dozen fish each for luncheon, and intimated that if we would go to their camp we should have some more, and some bread. I tore in two a piece of macintosh-stuff that I had, and Mr. Burke gave one piece, and I the other. We then went on to their camp, about 3 miles farther. They had caught a considerable quantity of fish, but most of them were small. I noticed three different kinds—a small one, that they call cupi, 5 to 6 inches long, and not broader

than an eel; the common one, with large coarse scales, termed peru; and a delicious fish, some of which run from 1 pound to 2 pounds' weight—the natives call them cawilchi. On our arrival at the camp they led us to a spot to camp on, and soon afterwards brought a lot of fish and bread, which they call nardoo. The lighting a fire with matches delights them, but they do not care about having them. In the evening various members of the tribe came down with lumps of nardoo and handfuls of fish, until we were positively unable to eat any more. They also gave us some stuff they call bedgery, or pedgery. It has a highly intoxicating effect when chewed even in small quantities. It appears to be the dried stems and leaves of some shrub.

Wednesday, May 8.—Left the blacks' camp at half-past seven, Mr. Burke returning to the junction, whilst I proceeded to trace down the creek. This I found a shorter task than I had expected, for it soon showed signs of running out, and at the same time kept considerably to the north of west. There were several fine water-holes within about 4 miles of the camp I had left, but not a drop all the way beyond that, a distance of 7 miles. Finding that the creek turned greatly towards the north, I returned to the blacks' encampment; and, as I was about to pass, they invited me to stay. I did so, and was even more hospitably entertained than before, being on this occasion offered a share of a gunyah, and supplied with plenty of fish and nardoo, as well as a couple of nice fat rats. The latter found most delicious. They were baked in the skins. Last night was clear and calm, but unusually warm. We slept by a fire, just in front of the blacks' camp. They were very attentive in bringing us firewood, and keeping fire up during the night.

Thursday, May 9.—Parted from my friends the blacks at half-past seven, and started for Camp 9.

Friday, May 10, Camp 9.—Mr. Burke and King employed in jerking the camel's flesh, whilst I went out to look for the nardoo-seed for making bread. In this I was unsuccessful, not being able to find a single tree of it in the neighbourhood of the camp. I, however, tried boiling the large kind of bean which the blacks call padlu; they boil easily, and when shelled are very sweet, much resembling in taste the French chesnut. They are to be found in large quantities nearly everywhere.

Saturday, May 11, Camp 9.—To-day Mr. Burke and King started down the creek for the blacks' camp, determined to ascertain all particulars about the nardoo-seed. I have now my turn at the meat-jerking, and must devise some means for trapping the birds and rats, which is a pleasant prospect after our dashing trip to Carpentaria, having to hang about Cooper's Creek, living like the blacks.

Sunday, May 12.—Mr. Burke and King returned this morning, having been unsuccessful in their search for the blacks, who, it seems, have moved over to the other branch of the creek. Decided on moving out on the main creek to-morrow, and then trying to find the natives of the creek.

Monday, May 13.—Shifted some of the things and brought them back again; Mr. Burke thinking it better for one to remain here with them for a few days, so as to eat the remains of the fresh meat, whilst the others went in search of the blacks and nardoo.

Tuesday, May 14.—Mr. Burke and King gone up the creek to look for blacks, with four days' provisions. Self employed in preparing for a final start on their return. This evening Mr. Burke and King returned, having been some considerable distance up the creek, and found no blacks. It is now settled that we plant the things, and all start together the day after to-morrow. The weather continues very fine; the nights calm, clear, and cold, and the days clear, with a breeze generally from south, but to-day from east, for a change. This makes the first part of the day rather cold. When clouds appear they invariably move from west to east.

Wednesday, May 15.—Camp 9. Planting the things, and preparing to leave the creek for Mount Hopeless.

Thursday, May 16.—Having completed our planting, &c., started up the creek to the second blacks' camp, a distance of about eight miles. Finding our loads rather too heavy, we made a small plant here of such articles as could best be spared. [Here follow a few meteorological notes.]

Friday, May 17, Nardoo.—Started this morning on a blacks' path, leaving the creek on our left, our intention being to keep a south-easterly direction until we should cut some likely-looking creek, and then to follow it down. On approaching the foot of the first sandhill, King caught sight in the flat of some nardoo-seeds, and we soon found that the flat was covered with them. This discovery caused somewhat of a revolution in our feelings, for we considered that with the knowledge of this plant we were in a position to support ourselves, even if we were destined to remain on the creek and wait for assistance from town. Crossing some sand-ridges running north and south, we struck into a creek which runs out of Cooper's Creek, and followed it down. At about five miles we came to a large water-hole, beyond which the water-course runs out on extensive flats and earthy plains. Calm night; sky cleared towards morning, and it became very cold. A slight easterly breeze sprang up at sunrise, but soon died away again. The sky again became overcast, and remained so throughout the

day. There was occasionally a light breeze from south, but during the greater portion of the day it was quite calm. Fine halo around the sun in the afternoon.

Saturday, May 18, Camp 16.—[No entry except the following meteorological entry on an opposite page, which may probably refer to this date.] Calm night, sky sometimes clear and sometimes partially overcast with veil-clouds.

Sunday, May 19.—[No entry beyond this citation of date.]

Monday, May 20.—[No entry beyond this citation of date.]

Tuesday, May 21, Creek.—[No entry beyond this citation of date.]

Wednesday, May 22, Cooper's Creek.—[No entry beyond citation of date.]

Thursday, May 23.—[No entry beyond this citation of date.]

Friday, May 24.—Started with King to celebrate the Queen's birthday by fetching from Nardoo Creek what is now to us the staff of life. Returned at a little after two P.M., with a fair supply, but find the collecting of the seed a slower and more troublesome process than could be desired. Whilst picking the seed, about eleven o'clock A.M., both of us heard distinctly the noise of an explosion, as if of a gun, at some considerable distance. We supposed it to have been a shot fired by Mr. Burke; but on returning to the camp, found that he had not fired nor heard the noise. The sky was partially overcast with high cum.-str. clouds, and a light breeze blew from the east, but nothing to indicate a thunderstorm in any direction.

Saturday, May 25.—[No entry beyond this.]

Sunday, May 26.—[No entry beyond this.]

Monday, May 27.—Started up the creek this morning for the dépôt, in order to deposit journals and a record of the state of affairs here. On reaching the sandhills below where Landa was bogged, I passed some blacks on a flat collecting nardoo-seed. Never saw such an abundance of the seed before. The ground in some parts was quite black with it. There were only two or three gins and children, and they directed me on, as if to their camp, in the direction I was before going; but I had not gone far over the first sandhill when I was overtaken by about twenty blacks, bent on taking me back to their camp, and promising any quantity of nardoo and fish. On my going with them, one carried the shovel, and another insisted on taking my swag, in such a friendly manner that I could not refuse them. They were greatly amused with the various little things I had with me. In the evening they supplied me with abundance of nardoo and fish; and one of the old men, Poko Tinnamira, shared his gunyah with me. . . . The night was very cold, but, by the help of several fires—[The entry

suddenly stops, but in the margin of the opposite page are written the names of several natives, and certain native words, with their meanings in English.]

Tuesday, May 28.—Left the blacks' camp, and proceeded up the creek. Obtained some mussels near where Landa died, and halted for breakfast. Still feel very unwell from the effects of the constipation of the bowels. The stools are exceedingly painful. After breakfast travelled on to our third camp coming down. Puy to Blowr [*sic*].

Wednesday, May 29.—Started at seven o'clock, and went on to the duck-holes, where we breakfasted coming down. Halted there at thirty minutes past nine for a feed, and then moved on. At the stones saw a lot of crows quarrelling about something near the water. Found it to be a large fish, of which they had eaten a considerable portion. Finding it quite fresh and good, I decided the quarrel by taking it with me. It proved a most valuable addition to my otherwise scanty supper of nardoo-porridge. This evening I camped very comfortably in a mia-mia, about eleven miles from the depôt. The night was very cold, although not entirely cloudless. A brisk easterly breeze sprang up in the morning, and blew freshly all day. In the evening the sky clouded in, and there were one or two slight showers, but nothing to wet the ground.

Thursday, May 30.—Reached the depôt this morning, at eleven o'clock. No traces of any one, except blacks, having been here since we left. Deposited some journals, and a notice of our present condition. Started back in the afternoon, and camped at the first water-hole. Last night being cloudy, was unusually warm and pleasant.

Friday, May 31.—Decamped at thirty minutes past seven, having first breakfasted. Passed between the sandhills at nine, and reached the blanket mia-mias at twenty minutes to eleven; from there proceeded on to the rocks, where I arrived at half-past one, having delayed about half-an-hour on the road in gathering some portulac. It had been a fine morning, but the sky now became overcast, and threatened to set in for a steady rain; and as I felt very weak and tired, I only moved on about a mile farther, and camped in a sheltered gully, under some bushes. Night clear and very cold. No wind. Towards morning sky became slightly overcast with cirro-str. clouds.

Saturday, June 1.—Started at a quarter to eight A.M. Passed the duck-holes at ten A.M., and my second camp up at two P.M., having rested in the mean time about forty-five minutes. Thought to have reached the blacks' camp, or at least where Landa was bogged, but found myself altogether too weak and exhausted; in

fact, had extreme difficulty in getting across the numerous little gullies, and was at last obliged to camp from sheer fatigue. Night alternately clear and cloudy, with occasional showers.

Sunday, June 2.—Started at half-past six, thinking to breakfast at the blacks' camp, below Landa's grave; found myself very much fagged, and did not arrive at their camp until ten A.M., and then found myself disappointed as to a good breakfast, the camp being deserted. Having rested awhile, and eaten a few fish-bones, I moved down the creek, hoping by a late march to be able to reach our own camp, but I soon found, from my extreme weakness, that that would be out of the question. A certain amount of good luck, however, still stuck to me, for, on going along by a large water-hole, I was so fortunate as to find a large fish, about a pound and a-half in weight, which was just being choked by another which it had tried to swallow, but which had stuck in its throat. I soon had a fire lit, and both of the fish cooked and eaten. The large one was in good condition. Moving on again after my late breakfast, I passed Camp 67 of the journey to Carpentaria, and camped for the night under some polygonum-bushes.

Monday, June 3.—Started at seven o'clock, and, keeping on the south bank of the creek, was rather encouraged, at about three miles, by the sound of numerous crows a-head; presently, fancied I could see smoke, and was shortly afterwards set at my ease by hearing a cooey from Pitchery, who stood on the opposite bank, and directed me around the lower end of the water-hole, continually repeating his assurance of abundance of fish and bread. Having with some considerable difficulty managed to ascend the sandy path that led to the camp, I was conducted by the chief to a fire, where a large pile of fish were just being cooked in the most approved style. These I imagined to be for the general consumption of the half-a-dozen natives gathered around, but it turned out that they had already had their breakfast. I was expected to dispose of this lot—a task which, to my own astonishment, I soon accomplished, keeping two or three blacks pretty steadily at work extracting the bones for me. The fish being disposed of, next came a supply of nardoo-cake and water, until I was so full as to be unable to eat any more, when Pitchery allowing me a short time to recover myself, fetched a large bowl of the raw nardoo-flour, mixed to a thin paste—a most insinuating article, and one that they appear to esteem a great delicacy. I was then invited to stop the night there, but this I declined, and proceeded on my way home.

Tuesday, June 4.—Started for the blacks' camp, intending to test the practicability of living with them, and to see what I could learn as to their ways and manners.

Wednesday, June 5.—Remained with the blacks. Light rain during the greater part of the night, and more or less throughout the day, in showers. Wind blowing in squalls from south.

Thursday, June 6.—Returned to our own camp; found that Mr. Burke and King had been well supplied with fish by the blacks. Made preparation for shifting our camp nearer to theirs on the morrow.

Friday, June 7.—Started in the afternoon for the blacks' camp, with such things as we could take; found ourselves all very weak, in spite of the abundant supply of fish that we have lately had. I myself could scarcely get along, although carrying the lightest swag—only about thirty pounds. Found that the blacks had decamped, so determined on proceeding to-morrow up to the next camp, near the nardoo-field.

Saturday, June 8.—With the greatest fatigue and difficulty we reached the nardoo-camp. No blacks, greatly to our disappointment. Took possession of the best mia-mia, and rested for the remainder of the day.

Sunday, June 9.—King and I proceeded to collect nardoo, leaving Mr. Burke at home.

Monday, June 10.—Mr. Burke and King collecting nardoo; self at home, too weak to go out. Was fortunate enough to shoot a crow.

[Here follow some meteorological notes, which appear to relate to another period.]

Tuesday, June 11.—King out for nardoo. Mr. Burke up the creek to look for the blacks.

Wednesday, June 12.—King out collecting nardoo. Mr. Burke and I at home, pounding and cleaning. I still feel myself, if anything, weaker in the legs, although the nardoo appears to be more thoroughly (?) digested.

Thursday, June 13.—Last night the sky was pretty clear, and the air rather cold, but nearly calm; a few cir-str. hung about the north-east horizon during the first part of the night. Mr. Burke and King out for nardoo. Self weaker than ever, scarcely able to go to the water-hole for water. Towards afternoon cir-cum. and cir-str. began to appear, moving northward; scarcely any wind all day.

Friday, June 14.—Night alternately clear and cloudy, cir-cum. and cum-st. moving northwards; no wind, beautifully mild for the time of year; in the morning some heavy clouds on the horizon. King out for nardoo; brought in a good supply. Mr. Burke and I at home, pounding and cleaning seed. I feel weaker than ever, and both Mr. Burke and King are beginning to feel very unsteady in the legs.

Saturday, June 15.—Night clear, calm, and cold; morning

very fine, with a light breath of air from north-east. King out for nardoo; brought in a fine supply. Mr. Burke and I pounding and cleaning. He finds himself getting very weak, and I am not a bit stronger. I have determined on beginning to chew tobacco and eat less nardoo, in hopes that it may induce some change in the system. I have never yet recovered from the effects of the constipation, and the passage of the stools is always exceedingly painful.

Sunday, June 16.—Wind shifted to north, clouds moving from west to east; thunder audible two or three times to the southward; sky becoming densely overcast, with an occasional shower about nine A.M. We finished up the remains of the Rajah for dinner yesterday. King was fortunate enough to shoot a crow this morning. The rain kept all hands in pounding and cleaning seed during the morning. The weather cleared up towards the middle of the day, and a brisk breeze sprang up in the south, lasting till near sunset, but rather irregular in its force. Distant thunder was audible to westward and southward frequently during the afternoon.

Monday, June 17.—Night very boisterous and stormy. Northerly wind blowing in squalls, and heavy showers of rain with thunder in the north and west. Heavy clouds moving rapidly from north to south; gradually clearing up during the morning, the wind continuing squally during the day from west and north-west. King out in the afternoon for nardoo.

Tuesday, June 18.—Exceedingly cold night. Sky clear, slight breeze, very chilly and changeable; very heavy dew. After sunrise, cir.-st. clouds began to pass over from west to east, gradually becoming more dense, and assuming the form of cum.-st. The sky cleared, and it became warmer towards noon.

Wednesday, June 19.—Night calm; sky during first part overcast with cir.-cum. clouds, most of which cleared away towards morning, leaving the air much colder, but the sky remained more or less hazy all night, and it was not nearly as cold as last night. About eight o'clock a strong southerly wind sprang up, which enabled King to blow the dust out of our nardoo-seeds, but made me too weak to render him any assistance.

Thursday, June 20.—Night and morning very cold, sky clear. I am completely reduced by the effects of the cold and starvation. King gone out for nardoo. Mr. Burke at home pounding seed; he finds himself getting very weak in the legs. King holds out by far the best; the food seems to agree with him pretty well. Finding the sun come out pretty warm towards noon, I took a sponging all over, but it seemed to do little good beyond the cleaning effects, for my weakness is so great that I could not do it with proper expedition. I cannot understand this nardoo at all;

it certainly will not agree with me in any form. We are now reduced to it alone, and we manage to get from four to five pounds per day between us. The stools it causes are enormous, and seem greatly to exceed the quantity of bread consumed: it is very slightly altered in appearance from what it was when eaten.

Friday, June 21.—Last night was cold and clear, winding up with a strong wind from north-east in the morning. I feel much weaker than ever, and can scarcely crawl out of the mia-mia. Unless relief comes in some form or other, I cannot possibly last more than a fortnight. It is a great consolation, at least, in this position of ours, to know that we have done all we could, and that our deaths will rather be the result of the mismanagement of others than of any rash acts of our own. Had we come to grief elsewhere, we could only have blamed ourselves: but here we are, returned to Cooper's Creek, where we had every reason to look for provisions and clothing; and yet we have to die of starvation, in spite of the explicit instructions given by Mr. Burke, that the depôt party should await our return, and the strong recommendation to the Committee that we should be followed up by a party from Menindie. About noon a change of wind took place, and it blew almost as hard from the west as it did previously from the north-east. A few cir-cum. continued to pass over toward east.

Saturday, June 22.—Night cloudy and warm. Every appearance of rain. Thunder once or twice during the night. Clouds moving in an easterly direction. Lower atmosphere perfectly calm. There were a few drops of rain during the night; and in the morning, about 9 A.M., there was every prospect of more rain until towards noon, when the sky cleared up for a time. Mr. Burke and King out for nardoo. The former returned much fatigued. I am so weak to-day as to be unable to get on my feet.

Sunday, June 23.—All hands at home. I am so weak as to be incapable of crawling out of the mia-mia. King holds out well, but Mr. Burke finds himself weaker every day.

Monday, June 24.—A fearful night. At about an hour before sunset a southerly gale sprang up and continued throughout the greater portion of the night; the cold was intense, and it seemed as if one would be shrivelled up. Towards morning it fortunately lulled a little, but a strong cold breeze continued till near sunset, after which it became perfectly calm. King went out for nardoo, in spite of the wind, and came in with a good load, but he himself terribly cut up. He says that he can no longer keep up the work, and as he and Mr. Burke are both getting rapidly weaker, we have but a slight chance of anything but starvation, unless we can get hold of some blacks.

Tuesday, June 23 [sic].—Night calm, clear, and intensely cold, especially towards morning. Near daybreak King reported seeing a moon in the east, with a haze of light stretching up from it: he declared it to be quite as large as the moon, and not dim at the edges. I am so weak that any attempt to get a sight of it was out of the question; but I think it must have been Venus in the zodiacal light that he saw, with a corona around her. Mr. Burke and King remain at home cleaning and pounding seed. They are both getting weaker every day. The cold plays the deuce with us, from the small amount of clothing we have. My wardrobe consists of a wide-awake, a merino shirt, a regatta-shirt without sleeves, the remains of a pair of flannel trousers, two pairs of socks in rags, and a waistcoat of which I have managed to keep the pockets together. The others are no better off. Besides these, we have between us, for bedding, two small camel-pads, some horsehair, two or three little bits of rag, and pieces of oil-cloth saved from the fire. The day turned out nice and warm.

Wednesday, June 24 [sic].—Calm night; sky overcast with hazy cum.-strat. clouds. An easterly breeze sprang up towards morning, making the air much colder. After sunrise there were indications of a clearing up of the sky, but it soon clouded in again, the upper current continuing to move in an easterly direction, whilst a breeze from the east and north-east blew pretty regularly throughout the day. Mr. Burke and King are preparing to go up the creek in search of the blacks. They will leave me some nardoo, wood and water, with which I must do the best I can until they return. I think this is almost our only chance. I feel myself, if anything, rather better, but I cannot say stronger. The nardoo is beginning to agree better with me; but without some change I see little chance for any of us. They have both shown great hesitation and reluctance with regard to leaving me, and have repeatedly desired my candid opinion in the matter. I could only repeat, however, that I considered it our only chance, for I could not last long on the nardoo, even if a supply could be kept up.

Thursday, June 25 [sic].—Cloudy, calm, and comparatively warm night, clouds almost stationary. In the morning a gentle breeze from east. Sky partially cleared up during the day, making it pleasantly warm and bright; it remained clear during the afternoon and evening, offering every prospect of a clear cold night.

Friday, June 26 [sic].—Clear cold night, slight breeze from the east, day beautifully warm and pleasant; Mr. Burke suffers greatly from the cold, and is getting extremely weak; he and King start to-morrow up the creek to look for the blacks: it is the only chance we have of being saved from starvation. I am weaker

than ever [*sic*], although I have a good appetite and relish the nardoo much, but it seems to give us no nutriment, and the birds here are so shy as not to be got at. Even if we got a good supply of fish, I doubt whether we could do much work on them and the nardoo alone. Nothing now but the greatest good luck can save any of us; and as for myself, I may live four or five days if the weather continues warm. My pulse is at forty-eight, and very weak, and my legs and arms are nearly skin and bone. I can only look out, like Mr. Micawber, "for something to turn up;" but starvation on nardoo is by no means very unpleasant, but for the weakness one feels, and the utter inability to move oneself, for, as far as appetite is concerned, it gives me the greatest satisfaction. Certainly, fat and sugar would be more to one's taste: in fact, those seem to me to be the great stand by for one in this extraordinary Continent; not that I mean to depreciate the farinaceous food, but the want of sugar and fat in all substances obtainable here is so great that they become almost valueless to us as articles of food, without the addition of something else.

(Signed) W. J. WILLS.

[In the last four days it will be observed that the dates are wrongly stated. Doubtless the melancholy situation of the party had in some degree affected the writer. The journal was kept in a note-book which was completely filled up, the signature being attached at the bottom of the last page. The journal closes on the 27th June; and about four days afterwards, King having left Burke dead on the route, returned to the hut and found that Wills also had expired.]

Mr. Wills's Astronomical Observations on his Return from Carpentaria to Cooper's Creek.

THESE observations consist of a series of sextant measures, for latitude, chronometer errors, and lunar distances, with two observations of the eclipses of Jupiter's satellites. The latitude observations I think were all approximately computed by himself, for the positions of the camps as laid down on his chart correspond very closely in that respect with those that have since been computed carefully from his observations. But, as regards the longitude, his chart positions I believe to be "by account," or "dead reckoning."

As the question of the longitude at which the Expedition reached the northern part of the continent is a matter of considerable interest and importance, the few observations available for the determination have been very rigorously computed, especially as, although they appear to have been made with every care possible, their results differ considerably from the plotted track at the northern portion of the journey, and appear somewhat anomalous.

It is especially fortunate that on the dates on which Mr. Wills made his lunar observations, the moon's places were obtained both at the Greenwich and the Williamstown observatories (having received observations made at Greenwich by last mail), enabling me to correct the observations for errors of the 'Nautical Almanac' which at two of the camps would have made his longitude from 20 to 30 miles east of where they really were. Subjoined are the positions of the camps at which longitude observations were made, deduced

from the observations. At all the other return camps, observations for latitude only were obtained, and their positions in that particular are laid down with sufficient accuracy on Mr. Wills's chart:—

		o			"		
Camp CXIX.—Northernmost camp	Lat.	17	53	38	S.		
	Long.	No observations.					
„ II.—Return, Feb. 15	Lat.	18	11	38	S.		
	Long.	140	59	30	E.		
„ III.—Return, Feb. 17	Lat.	18	16	30	S.		
	Long.	141	25	0	E.		
„ IV.—Return, Feb. 18	Lat.	18	23	16	S.		
	Long.	141	15	12	E.		
„ XII.—Return, Feb. 26	Lat.	19	13	47	S.		
	Long.	140	55	15	E.		

ROBERT L. J. ELLERY, Government Astronomer, &c.

No observations made on the journey from Cooper's Creek to Carpentaria have come to hand.

Memorandum for the information of His Excellency Sir H. Barkly.

It will be seen that Mr. Wills did not reduce his observations for Longitude, or he would not have plotted his route on the Exploration Chart, forwarded herewith, in the way he has done, at Camp 3 (R.) Return. This Camp, by the reduction of his observations at the Williamstown Observatory, would be very much to the eastward of his route, as plotted by himself, 24 miles and 12 seconds. But your Excellency will be pleased to learn that the differences between his own Map and the Astronomical Observations, as reduced at the Williamstown Observatory, are reduced to $3\frac{1}{2}$ miles at the Northern extremity of the route at the shores of the Gulf of Carpentaria, and leave no reasonable doubt as to its having been Flinders River which the Exploration reached.

C. W. V. LIGON, Surveyor-General.

Instructions to Leader.

Exploration Committee, Royal Society of Victoria,
Melbourne, 18th August, 1860.

SIR,—I am directed by the Committee to convey to you the instructions and views which have been adopted in connection with the duties which devolve upon you as Leader of the party now organized to explore the interior of Australia.

The Committee having decided upon Cooper's Creek, of Sturt's, as the basis of your operations, request that you will proceed thither, form a dépôt of provisions and stores, and make arrangements for keeping open a communication in your rear to the Darling, if in your opinion advisable; and thence to Melbourne, so that you may be enabled to keep the Committee informed of your movements, and receive in return the assistance in stores and advice of which you may stand in need. Should you find that a better communication can be made by way of the South Australian Police Station, near Mount Serle, you will avail yourself of that means of writing to the Committee.

In your route to Cooper's Creek, you will avail yourself of any opportunity that may present itself for examining and reporting on the character of the country east and west of the Darling.

You will make arrangements for carrying the stores to a point opposite Mount McPherson, which seems to the Committee to be the best point of departure from this river for Cooper's Creek; and while the main body of the party is proceeding to that point you may have further opportunities of examining the country on either side of your route.

In your further progress from Mount McPherson towards Cooper's Creek, the Committee also desires that you should make further détours to the right and left with the same object.

The object of the Committee in directing you to Cooper's Creek, is, that you should explore the country intervening between it and Leichhardt's track, south of the Gulf of Carpentaria, avoiding, as far as practicable, Sturt's route on the west, and Gregory's down the Victoria on the east.

To this object the Committee wishes you to devote your energies in the first instance; but should you determine the impracticability of this route, you are desired to turn westward into the country recently discovered by Stuart, and connect his farthest point northward with Gregory's farthest Southern Exploration in 1856 (Mount Wilson).

In proceeding from Cooper's Creek to Stuart's Country, you may find the Salt Marshes an obstacle to the progress of the camels; if so, it is supposed you will be able to avoid these marshes by turning to the northward as far as Eyre's Creek, where there is permanent water, and going then westward to Stuart's farthest.

Should you, however, fail in connecting the two points of Stuart's and Gregory's farthest, or should you ascertain that this space has been already traversed, you are requested if possible to connect your explorations with those of the younger Gregory, in the vicinity of Mount Gould, and thence you might proceed to Sharks' Bay, or down the river Murchison to the settlements in Western Australia.

This country would afford the means of recruiting the strength of your party, and you might, after a delay of five or six months, be enabled, with the knowledge of the country you shall have previously acquired, to return by a more direct route through South Australia to Melbourne.

If you should, however, have been successful in connecting Stuart's with Gregory's farthest point in 1856 (Mount Wilson), and your party should be equal to the task, you would probably find it possible from thence to reach the country discovered by the younger Gregory.

The Committee is fully aware of the difficulty of the country you are called on to traverse, and in giving you these instructions has placed these routes before you more as an indication of what it has been deemed desirable to have accomplished than as indicating any exact course for you to pursue.

The Committee considers you will find a better and a safer guide in the natural features of the country through which you will have to pass. For all useful and practical purposes it will better be for you and the object of future settlement that you should follow the watercourses and the country yielding herbage, than pursue any route which the Committee might be able to sketch out from an imperfect map of Australia.

The Committee intrust you with the largest discretion as regards the forming of dépôts, and your movements generally, but request that you will mark your routes as permanently as possible, by leaving records, sowing seeds, building cairns, and marking trees at as many points as possible, consistently with your various other duties.

With reference to financial subjects; you will be furnished with a letter of authority to give orders on the Treasurer for the payment of any stores or their transport; cattle, sheep, or horses you may require; and you will not fail to furnish the Treasurer from time to time with detailed accounts of the articles for which you have given such orders in payment.

Each person of the party will be allowed to give authority for half of his salary being paid into any bank, or to any person he may appoint to receive the same; provided a certificate is forwarded from you to the effect that he has efficiently discharged his duty.

The Committee request that you will make arrangements for an exact

account being taken of the stores and their expenditure by the person you place in charge of them.

The Committee also requests that you would address all your communications on subjects connected with the exploration to the Honorary Secretary; and that all persons acting with you should forward their communications on the same subject through you.

You will cause full reports to be furnished by your officers on any subject of interest, and forward them to Melbourne as often as may be practicable without retarding the progress of the expedition.

The Committee has caused the inclosed set of instructions to be drawn up having relation to each department of science, and you are requested to hand each of the gentlemen a copy of the part more particularly relating to his department.

I have the honour to be, Sir,

Your most obedient servant,

(Signed)

JOHN MACADAM, M.D.,

ROBERT O'HARA BURKE, Esq.,

Honorary Secretary, E.C., R.S.V.

Leader, Victorian Exploring Expedition.

Mr. Burke's Despatch from Torowotto.

(Received 3rd December, 1860.)

Torowotto, October 29th, 1860.

SIR,—I have the honour to report that I left Menindie on the 19th instant, with the party as per margin and Mr. Wright, who had kindly volunteered to show me a practicable route towards Cooper's Creek, for a distance of a hundred miles from the Darling; and he has more than fulfilled his promise, for we have now travelled for upwards of two hundred miles, generally through a fine sheep-grazing country, and we have not had any difficulty about water, as we found creeks or water-holes, many of them having every appearance of being permanent water, at distances never exceeding twenty miles. Mr. Wills's report, herewith forwarded, gives all the necessary details. Although travelling at the rate of twenty miles a day, the horses and camels have all improved in condition, and the country improves as we go on. Yesterday, from Wannaminta to Paldromatta Creek, we travelled over a splendid grazing country, and to-day we are encamped on a creek or swamp, the banks of which are very well grassed and good feed all the way from our last camp (44), except for two miles, and here the ground was barren and swampy. Of course it is impossible for me to say what effect an unusually dry summer would produce throughout this country, or whether we are now travelling in an unusually favourable season or not. I describe things as I find them.

Mr. Wright returns from here to Menindie. I informed him that I should consider him third officer of the expedition, subject to the approval of the Committee, from the day of our departure from Menindie, and I hope that they will confirm the appointment. In the mean time I have instructed him to follow me up with the remainder of the camels to Cooper's Creek, to take steps to procure a supply of jerked meat, and I have written to the doctor to inform him that I have accepted his resignation, as, although I was anxious to await the decision of the Committee, the circumstances will not admit of delay, and he has positively refused to leave the settled districts. I am willing to admit that he did his best, until his fears for the safety of the party overcame him; but those fears, I think, clearly show how unfit he is for his post. If Mr. Wright is allowed to follow out the instructions I have given him, I am confident that the result will be satisfactory; and if the Committee

think proper to make inquiries with regard to him, they will find that he is well qualified for his post, and that he bears the very highest character. I shall proceed on from here to Cooper's Creek: I may or may not be able to send back from there until we are followed up. Perhaps it would not be prudent to divide the party: the natives here have told Mr. Wright that we shall meet with opposition on our way there. Perhaps I might find it advisable to leave a depôt at Cooper's Creek, and to go on with a small party to examine the country beyond it: under any circumstances it is desirable that we should be soon followed up. I consider myself very fortunate in having Mr. Wills as my second in command; he is a capital officer, zealous and untiring in the performance of his duties, and I trust that he will remain my second as long as I am in charge of the expedition. The men all conduct themselves admirably, and they are all most anxious to go on; but the Committee may rely upon it that I shall go on steadily and carefully, and that I shall endeavour not to lose a chance or to run any unnecessary risk.

I have the honour to be, Sir,

Your most obedient servant,

R. O'HARA BURKE, Leader.

P. S.—The two blacks and four horses go back with Mr. Wright.

Dr. MACADAM, *Secretary*.

Mr. Burke's Despatch from Cooper's Creek.

(Received 30th June, 1861.)

Cooper's Creek, 13th December, 1860.

SIR,—I have the honour to report that the expedition under my command left Torowotto on the 31st of October, and arrived at Cooper's Creek on the 11th November, men, horses, and camels well. The road from Torowotto to Wright's Creek is good, but from Wright's Creek to the point where we struck Cooper's Creek it is in some places very stony, although not by any means impracticable. From the 11th of November we travelled slowly down the creek until the 20th of November, in order to recruit the strength of the animals. On the 20th we arrived at what I considered to be an eligible spot for the depôt, and we remained there (Camp 63) until the 5th instant, when we were driven out by the rats, and obliged to remove lower down, to the place from whence I now write (Camp 65), and where I have permanently established the depôt.

The feed upon this creek is good, and the horses and camels have greatly improved in condition; but the flies, mosquitoes, and rats which abound here render it a very disagreeable summer residence.

From Camp 63 we made frequent excursions in order to endeavour (in accordance with instructions) to find a practicable route northward, between Gregory's and Sturt's track, but without success. Mr. Wills, upon one occasion, travelled ninety miles to the north without finding water, when his camels escaped, and he and the man who accompanied him were obliged to return on foot, which they accomplished in forty-eight hours. Fortunately upon their return they found a pool of water. The three camels have not yet been recovered.

I am satisfied that a practicable route cannot be established in that direction, except during the rainy season, or by sinking wells, as the natives have evidently lately abandoned that part of the country for want of water, which is shown by their having sunk for water in all directions in the beds of the creeks.

I also think that it would be very desirable to establish the route to Cooper's Creek, and from Cooper's Creek to the north farther to the westward,

as the eastern, or upper part of the creek, up to Camp 63, runs through earthy plains, which even, now, in fine weather, are very difficult to travel over; but in winter, or during wet weather, they must be quite impassable for horses and cattle.

I have therefore left instructions for the officer in charge of the party, which I expect will shortly arrive here, to endeavour during my absence to find a better and shorter route between the dépôt (Camp 65) and Wright's Creek, or between the dépôt and the Darling. I proceed on to-morrow with the party as per margin to Eyre's Creek, and from thence I shall endeavour to explore the country to the north of it, in the direction of Carpentaria; and it is my intention to return here within the next three months at latest.

I shall leave the party which remain here under the charge of Mr. Brahé, in whom I have every confidence. The feed is very good; there is no danger to be apprehended from the natives, if they are properly managed; and there is, therefore, nothing to prevent the party remaining here until our return, or until their provisions run short.

I did not intend to start so soon, but we have had some severe thunder storms lately, with every appearance of a heavy fall of rain to the north, and as I have given the other route a fair trial, I do not wish to lose so favourable an opportunity.

We are all in good health, and the conduct of the men has been admirable. Mr. Wills co-operates cordially with me. He is a most zealous and efficient officer. I have promoted Mr. Brahé to the rank of officer—the position he is now placed in rendered it absolutely necessary that I should do so. He is well qualified for the post, and I hope the Committee will confirm the appointment.

I have given instructions to Mr. Brahé to forward this letter by the first opportunity.

I have the honour to be, Sir,

Your most obedient servant,

R. O'HARA BURKE, Leader.

Mr. Wright's Diary.

Saturday, 26th January. Pamamooroo, Darling River, New South Wales.—Packing stores until 11 A.M., when the camels were sent on under charge of Dr. Beckler, with instructions to camp on the west side of Pamamooroo Lake. Owing to the unruly dispositions of the horses recently purchased, it was one o'clock before Smith, accompanied by the native boy Dick (who had been persuaded to venture again in the interior), started with four of the horses, followed at 2 P.M. by Mr. Hodgkinson and Stone with five, and 3 P.M. by Mr. Becker and myself with the remaining four horses. The afternoon was occupied in packing and unpacking, nearly every horse throwing off his load, and the party becoming separated by the trouble thus caused. Smith was unable to find Dr. Beckler's halting-place, and camped about a mile and a-half to the east of it. Two horses broke loose, and went away with their packs into the thick polygonum of the lake, where they remained till next day. Distance, five miles; weather very hot, with occasional light breezes. Country occupied by Mr. McGregor.

Sunday, 27th. Pamamooroo Lake.—Started at dawn to look for the two missing horses. Took Dick with me, and found one some eight miles away, at a place called Tandower Swamp. Returned with it to camp, sending Dick after the other horse, which he recovered in the afternoon, and brought into camp. In accordance with my instructions Dr. Beckler had moved the camp two miles farther on the western border of the swamp. During the day Smith came up and reported his horses all safe. Resolved upon issuing the

following weekly scale of rations per man:—Flour, 7 lbs.; meat, 7 lbs., salt or dried; sugar, 1½ lb.; tea, 3 oz.; with preserved vegetables, rice, &c., at discretion. Thermometer at 2 P.M., 104 degrees.

Monday, 28th. Pamamooro Lake.—In consequence of the intense heat and the certainty of a small allowance of water for three or four days, I decided upon travelling at night, and instructed the party to prepare for a move a little before sundown. After breakfast Dick, the native, who had shown on several occasions a disposition to slip away, borrowed a clean shirt and then bolted. His unwillingness to accompany the party arose from his fear of the natives, and was to be regretted, as his absence deprived us of our only interpreter. At 10 A.M. the thermometer stood at 104 degrees in the shade, and at 2 P.M. had risen to 112 degrees. At a quarter to 6 o'clock commenced packing, and started at 9 P.M., with the rise of the full moon. The horses went first and were followed by the camels, both keeping Mr. Burke's track, which was well marked from the recent trip of Dr. Beckler to Duroodo. Continued travelling all night, the men walking and greatly fatigued.

Tuesday, 29th. Coorkerega, or Kokriega.—At 7 A.M. the horses arrived at the base of a rocky range, 25 miles north-west of the Darling, and camped in a glen close to the main track. A large cave, adorned with native drawings, and covered with the marks of various visitors, furnished an acceptable shelter from the scorching heat; and at 9 A.M. the whole party were recruited by the arrival of Dr. Beckler with the camels. Water being very scarce, owing to the evaporation from our leathern water-bags, Hodgkinson and Smith set to work cleaning out a well about 100 yards from the mouth of the cave. In a short time water commenced to percolate through the sand, and ultimately several buckets of a rather nauseous though desirable fluid were obtained. I then had another well sunk higher up the glen, and fortunately succeeded in procuring a bucket of water for nine of our horses, together with a sufficient supply for personal use. About 6 P.M. a cool breeze sprang up, but the horses suffered greatly from want of water, huddling round the well, and refusing to feed until near sunset, when they scrambled up the rocks and travelled along the crest of the range. Though there is no permanent water at Coorkerega, and in fact none nearer than the Darling, except at rare intervals, the worn-out cavities of the rocks furnish shelter to numerous marsupial animals, more particularly to a species of rock wallaby, termed wangaroo by the natives, and to the best of my belief not found southward of the Darling. I should, however, be infringing on the province of the naturalist were I to furnish a detailed description of this interesting animal; but I may state that I called Mr. Becker's attention to several which were shot by Mr. Hodgkinson during the progress of his party.

Wednesday, 30th.—On searching for the horses at dawn, it was found they had strayed considerably. Stone and Hodgkinson started in quest of them. Dr. Beckler, Belooch, and the cook packed the camels, and had just completed their task when Hodgkinson returned with one horse, and stated that he had followed the tracks of four until he caught one; the others, which were not in sight, heading straight for the Darling. Giving instructions to Dr. Beckler to move on with the camels to Bilpa, the next stage, I saddled the horse thus opportunely brought in and started after the others. It was dark ere they were recovered; but I decided upon moving, and started as soon as possible, camping within three miles of Bilpa, at which spot two water-bags had been deposited previous to our leaving the Darling. Dr. Beckler camped at Bilpa, and reported to me that a thunderstorm, accompanied by rain, had broken to the north of his course at 1 P.M., and a few drops had fallen at Bilpa. Distance from Coorkerega to Bilpa, twelve miles.

Thursday, 31st. Bilpa.—Started at dawn, and reached Bilpa with the horses at 6 A.M. Found the camels packed and just about to start. Kept

Hodgkinson to assist in watering the horses; and told Dr. Beckler to move on to Batoja, eighteen miles in front. The water remaining in the two pair of water-bags sent here from the Darling filled about fifteen buckets of seven quarts each, but was nauseous to the taste, being tainted by the smell from the camel tarpaulings with which it was covered. We were only too glad, however, to drink it, and to have the opportunity of giving each horse about two gallons. As there were two other pairs of bags at Batoja, I decided upon losing no time in going there, and immediately the horses were watered started for that spot, keeping Mr. Burke's track, and travelling over eighteen miles of uninteresting and arid sandhills. At 5 p.m. I rejoined Dr. Beckler, and heard with regret that two of the four bags cached near the camp were quite empty on his arrival, and that the other two only contained five buckets. The horses were suffering much from the want of water, being accustomed to a well-watered country, and it was evident that unless speedily relieved they would perish at the outset of the journey. Under these circumstances I resolved upon sending to Motanie or Mutwongee Ranges for water, Mr. Burke's track leading to them, and the distance to the first water not exceeding twenty miles. Mr. Hodgkinson and Belooch accordingly started in the morning with the ten camels and five pairs of water-bags. At 1 a.m. they reached the Motanie Range, tied up the camels, and worked all night at filling the bags from a small rocky basin situated in a gloomy ravine. During their absence Mr. Becker discovered a plant of Mr. Haverfield's containing a jar of water, but I did not make use of it, as the quantity was too small to be of much service, and I thought it likely Mr. Haverfield might suffer inconvenience and disappointment, as he was still out in the back country.

Friday, 1st February.—Upon inspecting the horses this morning, I found them so knocked up from thirst that a few hours' further suffering would inevitably cause the loss of several. I therefore thought it advisable to push on for the Motanie Ranges, leaving the packs, saddles, &c., behind. I was the more resolved to pursue this course, as Hodgkinson and Belooch were unarmed, and I thought it possible they might have fallen in with natives at the water, and been prevented from obtaining a supply. Shortly after dawn I started with Stone driving the horses. To my great satisfaction I met Hodgkinson and Belooch with a supply of water, ten miles from Batoja. I immediately gave the horses a bucket of water each, which enabled them to go on to Motanie, where we arrived in the course of the afternoon, and camped in a valley covered with kangaroo-grass, leading to a rocky basin containing an abundance of beautifully clear water.

Saturday, 2nd, to Thursday, 7th. Motanie Range.—During the period intervening between Saturday morning and Thursday, the 7th, the party was encamped in the Motanie Range, Dr. Beckler bringing up the camels with their loads, and Smith and Hodgkinson again returning to Batoja with six of the camels for the purpose of fetching up the horse packs, saddles, and bridles. As this country has doubtless been described to you by Mr. Burke as far as Torowotto (or Duroodo) Swamp, I do not think it necessary to state more than that it abounds in fine pasturage, and consists of a valley some twenty miles in length, flanked on its eastern and western sides by ranges of lofty hills, formed of rock, and intersected by picturesque gorges, in many cases forming at their heads fine pools of clear water. Though we saw the country under a very different aspect from that it presented at the period of Mr. Burke's transit, it appeared even at the time we passed through it still a fine and verdant tract. On Wednesday I moved the camp to another gorge about eight miles north. On Thursday morning we left Motanie Range, and shortly before sun-down reached Nantherunge Creek, eighteen miles distant from our last camp in the ranges.

Friday, 8th. Nantherunge Creek.—The morning broke cloudy, with strong

gusts of wind from the south-west. During the night it was piercing cold, and most of us were glad to augment our wearing apparel. Notherunge is a fine creek, with water-holes two-thirds of a mile in length, bordered with heavy gum-trees, but at this time the water in them was rather shallow. Near the camp there were some pine-bearing sandhills, and somewhat peculiar dome-shaped eminences. The camels, which had hitherto been tied up at night, I now turned out in hobbles, and found they gave little more trouble, if any, than the horses. This creek seemed to be a great resort for feathered game. Emu tracks were very numerous, and droves of water-hen ran along the margin. Early in the morning flocks of Sturt's pigeons came down from the sandhills to drink, and flights of parrots enlivened the vicinity of the camp by their cries. We saw no natives here, but there were a number of miamias close by us, and the fences which they form, in order to catch water-hen, met the gaze in every bend of the creek. At 6 A.M. we commenced packing, and at 11 A.M. started for the next creek, Wannaminta. Our course bore a little to the west of north, and the track was flanked on the right by a bold range called by the natives Tooritoro, and on the left by undulating sandhills, beyond which were the ranges east of Flood's Creek, called Wa-Ya-Booria. The sandhills were covered with pine and withered acacia, commonly known as mulgar. Grasses of various descriptions were abundant, and a small tree, with a light-green foliage and bushy form, lent quite a charm to the otherwise somewhat sombre character of the vegetation. The journey throughout the day was very heavy for the camel men, who, in consequence of the heavy loads on their beasts, were obliged to walk. About three miles from Wannaminta two small hills of a singular shape rear themselves from the flat country by which they are surrounded, and form a natural landmark, showing the termination of the plateau to the south. On reaching a spot midway between them, a fine view, peculiarly Australian, presents itself. To the north a line of white gum-trees mark the course of Wannaminta Creek; while at some distance (nine or ten miles) to the N.E. a bold but short and very remarkable range, called Koornbirri by the blacks, Wannaminta Range by Mr. Wills, and I understand Mount Jamieson by Mr. Haverfield, forms a striking feature in the scene. During the day two turkeys were seen, but were too wild to be approached within gunshot. We reached the creek at sundown, and estimated the distance from Nanthेरunge at twenty miles. The weather throughout the day was cold and cloudy, and at about 2 P.M. a slight shower fell. We reached Yeltawinge Creek at 4 P.M. I had to send back to our last camp for a swag of stores which was found to have been left behind. Mr. Hodgkinson shot six water-hen, a teal, and four of Sturt's pigeons.

Sunday, 10th.—Moved the camp eight miles to a fine waterhole on the Teltawinge. A number of emu were seen here, and several birds shot. Mr. Hodgkinson here complained of rheumatic pains. During the day the mirage was observable in every direction, and the range to the N.E. presented strange changes of outline as we approached it.

Monday, 11th.—At thirty-five minutes past 8 the camels left Teltawinge, but some delay was occasioned by two of the horses having strayed. Our course lay over clay-plains, on which Mr. Burke's track was very indistinct, and in some places altogether invisible. Koornbirri, of which Mr. Becker made a sketch, now bore S.E., and a large, though low, hill faced Teltawinge, on its western bank. The vegetation consisted chiefly of cotton bush and salsolaceous plants, and the absence of timber, except in the vicinity of the creek, rendered the scene rather uninteresting. The country around our camp of last night bore traces of inundation, and the footprints of the natives who had accompanied either Mr. Burke or Lyons were deep in the clay soil. Shallow watercourses intersected the wide plain extending around us, and every hollow was coated with dry sand, glistening and cracked. A

few of Sturt's pigeons, with occasionally a small bird not unlike a mule canary, were the only animated objects to be seen. The heat was excessive. The camels were unable to stand in one place more than a few minutes, lifting their feet from the hot sand in quick succession. An emu was started, which was feeding near the track; and so bewildered did the bird appear to be, that it kept walking in front and around us for some time, but eventually made off. At half-past 5 we reached Paldrumatta Creek, where we camped for the night, with abundance of shallow water of a creamy hue. The distance from Teltawingo to Paldrumatta is about twenty-two miles.

Tuesday, 12th.—We left Paldrumatta Creek at 9 A.M., running up its southern bank for about half a mile to Mr. Burke's crossing-place, and then ascending the northern bank, bounded by sandhills presenting the usual features. About a mile from Paldrumatta the track passes to the east of a salt lake, which presented a remarkable view, from the contrast of its snowy white incrustations with the scenery around. Mount Koorningbirri and other ranges were nearly out of sight. About 5 P.M. the horses reached Torowotto (or Duroodo) Swamp, and shortly afterwards were joined by the camel party, camping on the site of Mr. Burke's forty-fifth camp, though no numerals are marked on the tree bearing his initials.

Wednesday, 13th.—Torowotto Swamp, where I resolved on spelling for a couple of days, is one of a numerous series of hollows, receiving the drainage of the surrounding country, and presents a surface of thick green foliage, intersected by a thousand little watercourses, and traversed by a main channel running nearly east and west. Stunted box-trees overshadow the swamp, which is matted with a thick undergrowth of polygonum and plants particularly agreeable to the camels. Besides this there is abundance of marsilice, a plant creeping close to the ground, with leaves not unlike clover, and bearing a seed largely used by the natives as food. On this seed Lyons and McPherson subsisted for some time, and the tree under which they camped and pounded their bread was close by us. Shortly after our arrival at Torowotto a tribe of natives came towards us. They were about seventeen, perfectly unarmed. A tassel tied round the loins of the men, and a few emu feathers depending from the chin as ornaments, composed their stock of clothing. They appeared to be very healthy and in good condition. I gave them two tomahawks and some broken biscuit, endeavouring to make them comprehend that I wished two of them to accompany the party. I selected two, and gave them each a shirt. They were well acquainted with the various creeks, and named several places in advance, but our mutual ignorance of each other's language rendered it impossible to obtain any serviceable information. In the evening they brought their women to the camp, and freely offered them as presents in return for the few things we had given them. Most of the males were circumcised, but the cicatrices in the arms and breasts peculiar to some tribes were not marked in the Torowotto natives. The weather during the day was very hot, while occasionally, without the least intimation of its approach, a whirlwind would sweep round the packs and scatter the lighter articles in every direction. These winds moved in segments of circles, and their directions seemed quite capricious.

Thursday, 14th.—Spelled at Torowotto. The day was employed in mending saddles, cleaning firearms, and looking over the stores. I discovered that the flour planted by Mr. Burke had been dug up, the hoops of the cask lying near our camp. The camel-rug under which Lyons and McPherson lay was still suspended from the tree to which it had been tied, the natives apparently thinking it too heavy to be useful to them. All day our black visitors kept walking about, pilfering any little articles they could, and burying them in the sand with their feet.

Friday, 15th.—Rose at dawn, filled water-bags, packed and started the

horses at 8 A.M. and the camels at 9. Two of the natives accompanied the horses as guides, but proceeded only a short distance with us. On leaving Torowotto the tribe gathered together, and the women made a show of whimpering at our departure. Skirting the N.E. shore of the swamp for half a mile, we then struck over the sandhills on our old course to W. of N., passing over precisely similar country to that bordering the southern shores of the swamp. At eighteen miles' distance from Torowotto the track cut the summit of a lofty sand-ridge, affording a view of the surrounding country. To the north lay a dreary salt-bush plain, diversified by claypans, and flanked on its eastern and western slopes by sandhills of small elevation. As there was no sign of water, and the camel-men were fatigued by a long walk through heavy sand, I camped upon the verge of this plain, and experienced considerable difficulty in preventing the horses from wandering during the night back to Torowotto. No water. Weather close and oppressive.

Saturday, 16th. Mud-Plain Camp.—Fortunately we had brought from Torowotto a pair of leather bags filled with water, and all the goat-skin bags. The latter, however, would not retain water at all, and arrived at the camp nearly empty. Neither camels nor horses would feed; the former, though closely hobbled, going straight away, and requiring strict watching to keep them near the camp. At the period of Mr. Burke's transit this country was completely bogged, the tracks of his party being deeply imbedded in the claypans around. At the date of my arrival not a sign of water was discernible, no birds could be seen save hawks, and the ground was burrowed in every direction by rats, which seemed to exist independent of water. As the cattle were suffering from thirst, I sent Stone back with the horses to Torowotto, and Dr. Beckler, Mr. Hodgkinson, and Belooch with the camels. They took all the water-bags with them. Shortly after their departure, I started with Smith to look for water in a northerly direction. Mr. Becker and Purcell remained at the camp. At 7 P.M. a peculiarly brilliant meteor fell towards the N.E.

Sunday, 17th. Mud-Plain Camp.—Dr. Beckler, Mr. Hodgkinson, Stone, and Belooch returned to camp with the cattle and a supply of water. I was absent throughout the day, searching the N.W. boundary of the plain and adjacent ranges for water, and ultimately discovered a small puddle about twenty miles north of the camp, and about two miles west of Mr. Burke's track. Weather intensely hot.

Monday, 18th. Mud-Plain Camp.—During the night the camels and horses were very troublesome, requiring watching to prevent them straying in search of water. The water-bags were protected as well as possible from evaporation, by tarpaulins. At 3 P.M. I returned to camp with Smith, having travelled at least 140 miles since my departure on the 16th. I found the country in front of the most fearful description. Mr. Burke's track runs to the N.N.W., over some high ranges covered with sharp stones, and emerges upon the plains upon which we are camped, at a spot where it changes to an apparently limitless expanse of dried mud. The track is utterly effaced, and the whole country the picture of desolation, not a vestige of herbage growing upon the plains. The horses were watched throughout the night, and the camels tied up. A bucket of water was given to each quadruped from our water-bags.

Tuesday, 19th.—At 4 A.M. called all the hands. Saddled and started with the horses at 7 A.M., the camels following half an hour later. A fierce glare, even at this early hour, rose from the plains, and the sun beat down overhead with an intense heat. Till 1 o'clock we traversed this weary plain of baked mud, skirting the sandhills upon its western flank, and leaving Mr. Burke's track, which ran more to the eastward. Not a sign of animal life was discernible, save the clouds of flies which tormented us throughout the journey.

At 1 P.M. two prominent headlands reared themselves to the west, and in a

bay between them was sufficient feed to warrant me in camping there, at about one and a-half miles distant from the water I had discovered. I had left the horses to go on in advance, and returned to the camels in order to lead them to the spot, previously cautioning those in charge not to let the horses get to the water. Unfortunately, however, the horses rushed into the hole in spite of every opposition, and in a very few minutes rendered it a mass of mud. The camels were tied up during the night to some bushes, on which they greedily fed, but the horses remained near the water. At nightfall a thunder-storm gathered in the western horizon, breaking upon us and passing, unaccompanied by rain, to the southward. For hours afterwards we were buoyed up by the hopes of a rainfall, but, beyond a few drops, none fell near our camp, though it seemed to be raining heavily a short distance to the southward.

Wednesday, 20th. Rat Point.—This morning slight showers fell, from which we managed to collect three or four quarts of water. At thirty minutes past one I started with Smith in search of water, taking about eight quarts from the bags as a supply, and two camels. Previous to leaving, I inspected the store of water at the camp, and found it to amount to forty-two quarts for eight camels, thirteen horses, and six men. The nearest supply known to us was at Torowotto, thirty-eight miles distant. I placed the water in Mr. Hodgkinson's charge, with instructions to issue two quarts daily to each man, and three pints to each horse, and requested Dr. Beckler to take a pair of water-bags to the mud-hole and scoop up any small quantity he might be able to obtain. I also instructed Stone if I was not back by 10 A.M. on Friday following to return to Torowotto with the horses, and Dr. Beckler, Mr. Hodgkinson, and Belooch with the camels, for a supply of water. Dr. Beckler succeeded in obtaining four quarts of a very indifferent fluid from the hole. Thunder continued throughout the day, but no rain fell. A water-hen was shot close to the camp in the afternoon.

Thursday, 21st. Rat Point.—The camels remained near the camp all last night. The first annoyance was experienced from the rats, which abound throughout this country.

Friday, 22nd. Rat Point.—The rats visited the camp in myriads, not only gnawing through every pack-bag, but absolutely biting the men when at rest. The horses suffering greatly from thirst, Stone started with them for Torowotto, and at a few minutes past ten I returned to camp just as Dr. Beckler, Mr. Hodgkinson, and Belooch were starting with the camels. During my absence I travelled upwards of a hundred miles, crossing the country northwards in every direction, without finding a drop of water. The camels with me suffered greatly from rapid travelling and thirst, but I thought it best to send them on at once with the others to Torowotto. Stone and the camel party met with water from the late rainfall about ten miles from camp, and the horses returned in the evening after drinking as much as they could. Dr. Beckler also came back with a pair of water-bags containing a small supply, but Mr. Hodgkinson and Belooch went on, as no more water could be found near the spot.

Saturday, 23rd.—Remained in camp throughout the day. At 10 P.M. Mr. Hodgkinson and Belooch returned with a supply of water, which they had procured from the claypans on the plain, sixteen miles distant.

Sunday, 24th. Rat Point.—Mr. Hodgkinson reporting that a good supply of water might be stored by sinking a hole in the vicinity of the claypans from which he obtained the late supply, I instructed him to proceed thither with Dr. Beckler, and sink a hole for that purpose. At the same time I sent six of the camels and Stone with all the horses to spell there, during my absence on a further attempt to explore northward. Should the claypans dry up previous to my return, they were to proceed to Torowotto, leaving Mr. Becker and Purcell at Rat Point in charge of the stores. At noon I left Rat

Point with Smith and Belooch, four camels, and seven days' rations, resolving to penetrate to the first permanent water on the line of route, and if possible to reach Gooper's Creek, which I conjectured to be within a hundred miles. Dr. Beckler, Mr. Hodgkinson, Stone, and the cattle remained near the claypans; the two former sinking a hole and watching the camels, and the latter attending to the horses. In order to preserve the continuation of events at the camp during my absence, the report of my trip will be given on the date of my return.

Monday, 25th.—Dr. Beckler and Mr. Hodgkinson finished sinking their water-hole this morning, and collected a considerable supply of water from the claypans adjacent. Neither camels nor horses strayed from the vicinity.

Tuesday, 26th. Rat Point.—The water in the claypans being exhausted, Dr. Beckler, Mr. Hodgkinson, and Stone moved with the cattle to Torowotto, reaching that place at 3 p.m. The natives were still at the swamp, and very friendly.

Wednesday, 27th. Rat Point.—Dr. Beckler, Mr. Hodgkinson, and Stone remained at Torowotto with the cattle; Mr. Becker and Purcell at Rat Point.

Thursday, 28th. Rat Point.—Dr. Beckler conveyed a supply of water to Rat Point, and Mr. Hodgkinson and Stone remained with the cattle at Torowotto.

Friday, 1st March. Rat Point.—The party, as before mentioned, were divided between Torowotto and Rat Point. A drizzling rain fell through the night at Torowotto. The natives became rather troublesome, pilfering little articles.

Saturday, 2nd. Rat Point.—Dr. Beckler returned to Torowotto with rations. The party were stationed as before. Mr. Hodgkinson killed a snake some three feet in length, very thick in proportion to its length, of a dirty deep brown colour, with large livid irregularly-marked blotches. The natives represented it as highly poisonous, but did not scruple to devour it with great relish.

Sunday, 3rd. Rat Point.—No change in the disposition of the party.

Monday, 4th. Rat Point.—Still no change.

Tuesday, 5th. Rat Point.—No change. Prepared to return to Rat Point on the following day.

Wednesday, 6th. Rat Point.—Mr. Hodgkinson took a supply of water to Mr. Becker and Purcell, from Torowotto.

Thursday, 7th. Rat Point.—The party stationed at Rat Point and Torowotto, as before.

Friday, 8th. Rat Point.—Mr. Hodgkinson returned to Torowotto with rations, having previously submitted to Mr. Becker a plan for following my track, as they were apprehensive, from my lengthened absence, that some accident had occurred to me. The horses strayed from Torowotto, but were recovered some ten miles distant.

Saturday, 9th. Rat Point.—No change in the disposition of the party.

Sunday, 10th. Rat Point.—Dr. Beckler and Messrs. Hodgkinson and Stone, having filled six pair of water-bags, started for Rat Point with the intention of pushing out in search of me, with four of the camels and two men; but on their arrival at the waterhole, sixteen miles from Rat Point, found Smith and Belooch, whom, on my arrival this morning, I had sent there with the camels, and instructions that Stone should return accompanied by Smith to Torowotto, that Dr. Beckler should at once push on to Rat Point with water, and that he should be followed on the following day by Mr. Hodgkinson and Belooch with the camels. The events occurring during my absence northward are as follow:—On February 24th, the day I started, I went about twelve miles nearly due north, searching for water in every likely spot, and camping upon a dry sandy creek. From thence I proceeded twenty

miles farther on the same course, crossing large dry gum-creeks running from all directions, and finally camped on one of them. The third day, while still seeking water, I saw Mr. Burke's track for the first time since leaving Rat Point, and camped that evening upon some sandhills to east of Karripundi Swamp, whence I could not obtain water, in consequence of the boggy nature of the ground, and the presence of a large body of natives. The next morning I struck for the north-east, over a sandy undulating country, and at 2 p.m. reached a large watercourse coming from the eastward, but containing no water. Upon the fifth morning, at dawn, I noticed a fire from a native camp, about half a mile from my own, and passed the day in searching for water, not once seeing Mr. Burke's track, which I then conjectured must be upon the north-western side of the swamp. On the sixth morning I found the camels greatly exhausted from fatigue and want of water, they having had but twelve quarts each since leaving Rat Point. I returned, therefore, to where I had seen the water in the swamp, and camped, still unable to get a supply. The following (seventh day) I skirted the swamp, and at noon succeeded in reaching a place where the water was accessible. On tasting it, it was found to be excessively brackish, or rather like lime-water, since when thrown on the heated claypans it caused a hissing sound. The camels drank greedily without any ill effects, but the men and myself suffered from it very considerably. On the eighth morning I returned to the place where I had last seen Mr. Burke's track, and found that he had diverged from his course of N. by W. to N.E. Our rations were this day all finished, with the exception of three pounds of oatmeal and a little tea. I was determined, however, to push on to the next permanent water, in order to be enabled to bring on the party. I gave orders that each man should have three spoonfuls of oatmeal per diem. Camped thirty-four miles from the lime water in Karripundi Swamp, on a sandhill. On the ninth day I made a water-hole about five miles north-east of my last camp, and saw two bullocks there. Passed on, and twenty-seven miles farther, still crossing undulating sandy country, reached a fine creek (Poria), and camped six miles on its north side. On the tenth morning I made a camp of Mr. Burke's, marked 52, and situated upon a dry arm of Bulloo Creek. Crossed during the day, twenty-five miles from Poria Creek, another fine creek (Koorliatto), apparently dry. Saw no water or natives throughout the day, though signal-fires rose in every direction, at brief intervals. On the eleventh day I reached Bulloo, and after remaining a few minutes returned to Rat Point, arriving there on the fifteenth day. We were fortunate enough to kill a turkey and three pigeons during our return, the former of which enabled us to get along tolerably well, but the pigeons were stolen by the rats in the night.

Monday, 11th. Rat Point.—The horses and camels strayed during the night from the water-hole dug upon the plains to Torowotto, and it was 12 o'clock before the latter reached Rat Point, as they were not overtaken till they had regained the swamp. The horses were left in charge of Stone and Smith at Torowotto, with orders to start thence on Wednesday. The health of the men gave me much anxiety. Smith, Belocch, and myself suffered from diarrhœa. Mr. Becker and Stone manifested scorbutic symptoms, and Purcell had swollen legs and numerous sores. Trusting that a change from the inaction of Rat Point would benefit them, I gave orders to start on the following morning.

Tuesday, 12th.—Upon uncovering our stores, which we had buried, in order to preserve them as much as possible from the rats, I was gratified to find that less damage had been caused than I had had reason to expect. I thought proper to despatch Dr. Beckler, Mr. Becker, Mr. Hodgkinson, Purcell, and Belocch, with the camels in advance, so that the water they carried might enable the horses to reach the water-hole I had discovered between Karripundi and Poria Creek, a distance of 102 miles from Torowotto. After

travelling twelve miles, the camels had to stop, from the bottom of one of the pack-bags falling out. Mr. Becker and myself remained at Rat Point.

Wednesday, 13th.—I had given orders to Dr. Beckler not to tie up the camels at night, in order that they might have every opportunity to feed. Unfortunately the majority of them took advantage of this liberty to stray back to Torowotto, and Dr. Beckler and Belooch had to return there, a distance of fifty-two miles, for their recovery. Mr. Hodgkinson and Purcell remained with the saddles, stores, and water, amounting to twenty buckets. Dr. Beckler, in returning to Torowotto, took three pairs of water-bags with him, and previously to his starting a couple of buckets were given to the camel he rode. Stone and Smith came into Rat Point with the horses, as instructed, and camped there with Mr. Becker and myself. The weather was so fearfully hot that the horses appeared knocked up by their journey from Torowotto here.

Thursday, 14th. Mud Plains.—I started early in the morning with the horses, and on reaching the camel camp, at twelve miles' distance, gave each horse a bucket of water, and took four buckets for use. Leaving instructions for the camels to push on as soon as they should arrive from Torowotto, I hastened onwards with Mr. Becker, Stone, Smith, and the horses, reaching the water-hole north of the Karriapundi Swamp on the 16th inst., after experiencing great difficulty, both men and horses being knocked up; our supply of four buckets of water from the camel-camp having almost all leaked away.

Friday, 15th. Mud Plains.—Mr. Hodgkinson and Purcell remained at the camel-camp with the stores. Dr. Beckler and Belooch were engaged in getting the camels back from Torowotto.

Saturday, 16th. Mud Plains.—Dr. Beckler and Belooch returned from Torowotto with the camels, and rejoined Mr. Hodgkinson and Purcell at the camp.

Sunday, 17th.—The camel camp started after me, and reached a spot seventeen miles in advance of their last camp. Fortunately for them, a shower fell, which filled the claypans near their camp, and enabled the camels to drink to their content. Purcell was reported to me as suffering greatly from pains in his legs, and rode upon one of the camels throughout the day. Two of the camels, Gobin and Raugée, had very bad hump-sores, from the ill-fitting saddles supplied them. The horses reached Poria Creek with the party accompanying me, and one horse died from want of water and fatigue, though every caution was used in supplying the weaker ones with a drink.

Monday, 18th. Karriapundi Plains.—The camels, skirting the north-west bank of Karriapundi Swamp, camped about eight miles to the north of it. Gobin, one of the camels, became very footsore, and his load was distributed among the other camels. Coppin, or Janglee, one of the Cremorne camels, was also slightly affected in the same manner; and the whole of the camels were considerably fatigued by the heavy work they had lately performed. Shadow, the smallest of the camels, was by far the best in condition, and carried her heavy load with apparent ease. Another horse died at Poria to-day from the effects of his push across the waterless plain south of it.

Tuesday, 19th. Mud Plains, at 3 p.m.—Still among the same uninteresting salt-bush plains. The camels reached the water-hole where the horses had camped on the 16th inst. Mr. Hodgkinson and Belooch contrived to preserve sufficient water by digging a hole and filtering the mud through the large marsh-mallow seeds growing near the spot. Smith, whom I sent this morning from Poria Creek with a supply of water, joined the camel party in the afternoon, but found them tolerably well supplied from the rain that had fallen south of Karriapundi.

Wednesday, 20th. Poria Creek.—The camel party reached Poria Creek

this day, and I found Purcell much worse than when I last saw him at Rat Point. Poria is a fine creek, abounding in fish, and when very full throwing its surplus waters towards Karriapundi. Our camp was situated at its south termination, its course being nearly north and south. The banks were fringed with stunted bastard box, and we derived much benefit during our stay there from the waterfowl shot.

Thursday, 21st, to Thursday, 28th. Poria Creek.—During the period included between the above dates I spelled the party at the creek, hoping that the men would in some degree regain their health. I regret to state, however, that I had little reason to congratulate myself upon the results. Mr. Becker and Purcell became much worse, and utterly unable to walk about, and Smith and Stone did not at all improve, though energetically discharging their respective duties. As I had found no water in the crossing at the next creek (Koorliatto), I sent Dr. Beckler, Smith, and Belooch thither with a supply, directing them to conceal it as well as possible from the natives.

Friday, 29th. Poria Creek.—The rats committed great ravages during our stay at this creek, and were far bolder than the majority of domesticated animals in their attacks. Owing to the necessity of examining every bag, it was half-past 12 before the camels started with Dr. Beckler, Mr. Becker, and Purcell, who had to be carried upon camels. Mr. Hodgkinson and Belooch, Smith, Stone, and myself, remained at the creek with the horses. The camel party camped at 4 P.M. on the site of Mr. Burke's 51st camp. A heavy fall of rain took place during the night.

Saturday, 30th. Koorliatto Creek.—At 9 A.M. the camels started, the rain still falling, but ceasing in an hour's time. At 3 P.M. they reached Koorliatto Creek, and at 8 P.M. the horses, which travelled from Poria, joined them. Stone, who had received a wetting on the night of the 29th, became much worse, and I had a tent put up for Mr. Becker and Purcell, who were unable to proceed farther. We found the creek running, though dry a few days before. Its course trended from E. to N.W. for seven or eight miles, skirting the south-west base of the Bulloo Range, and then turning sharp to the west direct for Poria Creek, of which I conjecture it to be a main feeder. There was much more timber on this creek than on Poria, and splendid feed for the cattle on the sandhills adjacent.

Sunday, 31st. Koorliatto Creek.—Morning broke piercingly cold, with a cloudy sky and drizzling rain. About 10 A.M. the rain cleared off, but I did not think it prudent to move with so many sick.

Monday, 1st April. Koorliatto Creek.—Spelled, as rain fell at intervals throughout the day. No improvement in the health of the men.

Tuesday, 2nd. Koorliatto Creek.—Though the weather cleared up, I was compelled to remain in camp, Stone being affected with severe rheumatic pains. In the morning a native made his appearance, and gave us the names of the surrounding localities. He wore no covering, save a tassel of native grass round his loins, and pointed out Bulloo as lying much more to the west than our course lay. After taking a minute survey of the camp, he left.

Wednesday, 3rd. Koorliatto Creek.—Seeing plainly that any attempt to move Mr. Becker and Purcell would retard their prospect of ultimate recovery, and finding no cause for apprehension from the natives, I resolved to push forward to Bulloo, which I conjectured from our northern position would be Cooper's Creek. My anxiety to move arose from the fact that I feared Mr. Burke's stores must require replenishment, and that any party left at Cooper's Creek would be anxiously expecting our arrival. On these considerations I gave orders to prepare for a start on the following day.

Thursday, 4th. Bulloo or Wright's Creek.—At 9 A.M. the camels started, under charge of Mr. Hodgkinson and Belooch, Gobin's saddle being left behind, as her back was getting very sore, and her lameness incapacitated her from

carrying any load. Considerable difficulty was experienced in crossing the creek, which had been slightly escarped from the steepness of the banks, but eventually the camels with their loads were got over without injury. The track led over the narrow belt of sandhills bordering the north bank of the creek, and then, debouching upon an extensive plain, intersected with water-courses, and crowded with rat-holes, pursued a course some few degrees to the east of north. In places Mr. Burke's track was hardly perceptible, but no difficulty was found in regaining it, as it was flanked on the west side by the Bulloo Range, and on the east side by a line of creek-timber running with prominent headlands towards it at distances varying from six to eight miles. Twelve miles from Koorliatto we passed one of these points where Mr. Burke had pitched his 52nd camp. We found no water there. Eight miles farther we sighted Bulloo, and established the camp at the point where we first struck it. The horses which started after the camels overtook the latter, and reached camp about half an hour before them. We saw no natives throughout the day, save two who accompanied us a few miles from Koorliatto, but signal-fires broke out in all directions. The weather continued fearfully hot.

Friday, 5th, to Wednesday, 17th. Bulloo.—Throughout the period included in the above-mentioned dates Mr. Hodgkinson, Stone, Smith, and Belooch remained with me at Bulloo, spelling the camels and occasionally visiting Koorliatto, to convey supplies to the party there. Dr. Beckler's patients were gradually sinking, and Stone became much worse. As the natives were very numerous, and apparently collecting from the surrounding districts, I cut logs for a rough stockade, which was subsequently erected. Though there was no feed near the camp, at four or five miles' distance grass and salsolaceous plants were abundant, so that the cattle rapidly improved. From the absence of any indication that Mr. Burke had stopped at this creek, I felt convinced that Cooper's Creek lay still farther in advance, and made two advances, north-east and north-west, for the purpose of tracing the course of the track. I found Bulloo watercourse to consist of a large sheet of water, extending some five miles to the north of our camp, with a breadth of 100 to 200 yards and a depth in some parts of sixteen or twenty feet. Fish of a considerable size were caught by the party; and at the northern termination of the water-hole, where the creek branched with insignificant channels, numbers of ingeniously-constructed fishing dams showed that the natives derived a considerable sustenance from its waters. At the northern commencement of the small channels, which apparently connect the larger water basins, but from their intricate courses are difficult to follow, the plains became extremely stony, and the track, turning rapidly to the west, completely obliterated. On the two occasions to which I have referred as advancing northerly I was compelled to turn back from the hostility of the natives, who, upon my camping, collected in large numbers, making fires all round me, and trying to entice Smith, who accompanied me, by means of their women. Bands often visited the camp, signifying the ground to be theirs, and ordering us to move away. All these demonstrations, in the present state of my party, gave me much anxiety, and I felt anxious to obtain additional stores for recruiting the sick and effectually supplying the advance party. I instructed Mr. Hodgkinson, therefore, to start for Menindie on the 18th instant, with Belooch and seven of the camels, to escort Mr. Becker and Purcell to that township, and having engaged two men in their places, to return as quickly as possible with stores. By these means I should do away with the inconvenience of two camps, afford two of the sick what I considered a chance of ultimate recovery, and only, by Dr. Beckler's return to the Bulloo camp, lose one available hand. Moving backwards or forwards with the whole *dépôt* was impossible with so many sick, and I thought myself still sufficiently strong to hold an intrenched position against any attack made by the natives.

Thursday, 18th. Bulloo.—This morning I sent Mr. Hodgkinson on his journey to Menindie, directing him to take charge of Mr. Becker and Purcell, and to request Dr. Beckler to rejoin me. I had constructed a cudjowar, or camel-palanquin, for the carriage of the two sick men, and I trusted that the prospect of a return to the settled districts would lend them energy for the journey. The natives visited the camp during the day, and pertinaciously hung round the stores. They were accompanied by a boy, some eight years of age, singularly impudent in his behaviour. Stone rapidly got worse, being seized frequently with severe rheumatic pains. Mr. Hodgkinson, as afterwards reported, reached Koorliatto.

Friday, 19th. Bulloo.—On this day Mr. Hodgkinson returned from Koorliatto, bringing with him a note from Dr. Beckler, in which that officer so strongly protested against the removal of Mr. Becker and Purcell to Menindie as to leave me no alternative but that of countermanding my instructions on that point. I therefore directed Mr. Hodgkinson to return to Koorliatto and bring Mr. Becker and Purcell to Bulloo, together with the whole of the camels, as I resolved not to send to Menindie any of the party until I could form some more definite opinion regarding the prospects of the recovery of the sick. Stone being much worse, I instructed Dr. Beckler to return without any delay, that he might afford his medical assistance. No natives came near the camp throughout the day, but the necessity of watching throughout the night fell very severely on the few in health.

Saturday, 20th. Bulloo.—Mr. Hodgkinson left for Koorliatto, reaching there at 11 A.M., but Dr. Beckler did not start for Bulloo, being unable to leave Mr. Becker and Purcell with safety.

Sunday, 21st. Bulloo.—Throughout last night signal-fires were burning around the camp here, and the natives imitated the howl of the native dog, apparently for the purpose of ascertaining our vigilance. Fifty-one rats were killed by means of a trap which I had made; but this slaughter, though greatly exceeding the subsequent nightly average, did not seem to diminish either their boldness or their numbers. Dr. Beckler arrived at Bulloo at 5 P.M., and Mr. Becker and Purcell were not reported as having suffered from their removal. Two tents were at once pitched for their accommodation. Mr. Hodgkinson remained at Koorliatto, as only two of the camels were found when Dr. Beckler and Belooch started.

Monday, 22nd. Bulloo.—Between 9 and 10 this morning, eight natives came to the camp, armed; and upon being told to move off, two went up, and the other six down the creek, joining respectively two bands who had crossed the plains west of the camp, and concealed themselves in the creek-timber. In a few minutes a large body of them appeared on the bank of the creek, distant sixty yards from our stores, thronging through the scrub, and occasionally showing in the open, in parties of seven and eight. A black fellow, who went by the appellation of "Shirt," from having had that garment presented to him by us, was particularly active, coming boldly up to the stores, and walking unconcernedly around them. He then picked up about forty rats, that were lying dead around, and, dropping a portion of them, motioned for me to pick them up and carry them for him, merely, I think, to get my head in an unguarded position. Several other blacks were meanwhile drawing nearer to us, violently gesticulating, making signs that they were hungry, and that we were camped upon their ground. One tall, strapping lubra accompanied them, and was exceedingly active, bearing a boomerang with considerable grace, and inciting her companions to attack us. At this time I had but two able men with me, Dr. Beckler and Smith, Belooch having started for Koorliatto to assist Mr. Hodgkinson in finding the camels and bringing them in. Our cooking-place was close to the creek, for the benefit of shade and water; and the utensils were round the fire, together with several

clothes which had been washed by the party. Dr. Beckler reporting to me that he saw natives creeping on their hands and knees near the fire, I took Smith down with me to clear them away. It was indeed high time. Several of them were fingering their boomerangs as if impatient for a fight; and lifting up the lappels of Purcell's tent, commenced unpacking the medicine-basket, while a third, with an armful of boomerangs, was throwing them carelessly upon the ground near his brother warriors. However, they were not quite resolved upon hostilities, as when Smith and I pointed our pieces at them they quietly moved off before us, and retired without any further manifestations of hostility. Throughout this scene Stone, though dying, behaved with great intrepidity, raising himself upon his bed and aiming his revolver at the natives when they approached him. About 2 P.M., just as the blacks moved off, I was called by Stone, who, grasping me by the hand, said, "I am going." He then spoke a few words, and repeatedly asked that cold water should be thrown over him, as he could not breathe. Within ten minutes from the time he first called me, he turned upon his face and died. At 7 P.M. he was buried near the camp, by Dr. Beckler and Smith. I have omitted to state that the blacks took away every portable article from the fire, throwing away the tea and salt, and taking the bags. Belooch reached Koorliatto early this morning, and Mr. Hodgkinson started with him towards Bulloo, but were compelled to camp eight miles from Koorliatto, owing to the late time at which they recovered the camels.

Tuesday, 23rd. Bulloo.—Mr. Hodgkinson and Belooch reached Bulloo with the camels at 8 this morning, and immediately they arrived we unpacked all the stores, and passed the day in mending rat-holes, and repacking them in the form of a stockade; two sides being formed by as many logs sufficiently straight as we could procure at a reasonable distance. These logs were about four feet in height above the ground, allowing us to fire easily over them. The other two sides were not so high, but still a tolerable protection. Inside the stockade, every available weapon was placed so as to be handy for immediate use, and some of us always slept within it. At the same time our fire was brought within ten yards of it, as we had no more cooking-apparatus to spare. Our watch commenced at 8 P.M., and terminated at 6 A.M.

Wednesday, 24th. Bulloo.—The first announcement this morning was that Purcell had died in the doctor's presence during the night. For some days past he had been so weak as to faint after drinking a little water, and we had long been expecting his decease. I sent Belooch and Smith to look after the horses which fed between Bulloo and a tributary creek. About an hour after they started the natives made their appearance, coming in twos and threes through the thick scrub on the creek, until about a score had collected. They were armed with new boomerangs, spears, and waddies, and were accompanied by the boy previously mentioned, whose conduct was even more impudent than before. At first the boy advanced with two powerful fellows hesitatingly towards the stockade, while in their rear could be seen a dozen others attentively watching their proceedings. Mr. Hodgkinson having brought in the things from the fire, I advanced with him towards the natives, motioning them to be off. Disregarding my attempts to clear them off, I caught hold of the boy, and, turning him round, gave him plainly to understand that he would not be allowed to remain near the camp. I thought proper to do this, as he was evidently only brought to insult us, and at length he retired with the others to a short distance. We then entered the stockade and watched the proceedings of the natives, who were joined about this time by another party from the south-west. The whole body then clustered around Stone's grave and became most insulting in their demeanour. Taking up a dead rat, one of them made a harangue upon it, and concluded by flinging it contemptuously

at us. Finding we did not notice this, they threw the earth from Stone's grave in the air, and after carrying logs as if mocking the erection of the stockade, made signs that we should all meet the same fate as those dead. I was very unwilling to fire at them, and allowed them to throw several sticks at us rather than commence actual hostilities. By noon they had concluded their demonstrations, and moved quietly off to a camp which they had established to the north of us. Smith and Belooch returned at nightfall, having been unable to find the horses. Shortly afterwards Dr. Beckler and Mr. Hodgkinson commenced digging Purcell's grave.

Thursday, 25th. Bulloo.—At daylight I directed Mr. Hodgkinson to complete Purcell's grave, and, with Dr. Beckler's assistance, he was buried by 8 A.M. Immediately after breakfast I started with Smith for the horses, but had not proceeded two miles before signal-fires rose all around me, and I returned to the camp, so that the natives should not derive any advantage from my absence. I should have premised that we had heard a horse-bell in the morning on the opposite side of Bulloo Creek, and that Mr. Hodgkinson, who swam over for the purpose, ascertained that six of the horses were feeding upon the bank. I now resolved upon crossing them if possible, and Dr. Beckler swam with Mr. Hodgkinson across the creek at mid-day, for the purpose of driving them into the water. This desirable object was accomplished, after a little delay in getting them to take the water. The natives did not molest us throughout the day, and in the afternoon I disposed of the few clothes belonging to the men lately deceased, as some of us were sadly in want of a fresh supply.

Friday, 26th. Bulloo.—The day passed very quietly, no natives appearing.

Saturday, 27th. Bulloo.—This morning, fortunately, no one went after the cattle, as the horses were quietly feeding within sight, and the camels came home with great regularity at sunset, camping close to the stockade. The stores were all unpacked, and, after the rat-holes had been mended, replaced in their former position. About 11 o'clock the cry of "Natives!" started us to our feet, and every article near the fire was carried into the stockade with the utmost celerity. On looking out, a body of natives, numbering between forty and fifty, could be seen advancing towards us from the west, not seeking any cover, but marching in good order straight across the open plain. On this occasion I saw plainly that they meant mischief, as they were all painted, and bore more spears than we had seen on any former occasion. Most of them were painted with a deep-red band, from the neck down the centre of the chest, crossed by similar bands at right angles to it. When within a couple of hundred yards, they quickened their pace into a run, exciting each other with war-cries, and placing their arms in position. "Shirt," accompanied by two other leaders, was in the van, and despite all my motions for them to stop, had approached within a few yards of us before I gave the order to fire. A few discharges repulsed them, but as they collected again some 600 yards off, I fired a rifle at them and effectually dispersed them. As soon as they disappeared, we visited Mr. Becker in his tent, and found that he was quite unconscious of any unusual occurrence. I now resolved to quit Bulloo immediately, as such a small party was quite unfit to maintain a long contest against the large tribes around, and any men would be picked off while necessarily absent in search of the camels. I instructed Mr. Hodgkinson and Smith to get up the camels without delay, and all save Coppin and Mutwala, which could not be found, were brought in, and tied around the stockade.

Sunday, 28th. Bulloo.—At 6 A.M. Dr. Beckler and Belooch started after the two missing camels, and succeeded in getting them. The day was passed in preparing for a start on the following morning—repacking the loads, and burning all articles of a cumbrous and useless description. The cattle were kept near the camp all day, and appeared inclined to remain near us.

Monday, 29th. Bulloo.—The horses were very troublesome during the night, perpetually trying to steal away, and, though closely hobbled, more than once attempting to swim the broad creek. About 3 A.M. a bell was heard from the south, and a number of dark objects, like cattle, could be dimly seen through the darkness. When daylight broke these objects were recognised as forming part of the mob of horses taken on by Mr. Burke, and shortly afterwards Mr. Brahé came up, and reported that he had just arrived from Cooper's Creek, where Mr. Burke had left him on the 16th of December in charge of a dépôt consisting of Patten, McDonough, Botan, six camels, and twelve horses. Mr. Brahé had received instructions to remain at Cooper's Creek for three or four months, but had extended that period to eighteen weeks, and only left when his rations ran short. Previous to leaving he had made a cache of provisions, sufficient to enable Mr. Burke and party, if competent to retrace their steps, to reach the Darling. Mr. Brahé had not followed Mr. Burke's track to Bulloo, but had pursued a direct course, and reached the 52nd camp of Mr. Burke, eight miles south of my dépôt, in about eighty miles. His horses had been 100 hours without water, but travelled with much less difficulty than could have been hoped for. On proceeding to Mr. Brahé's camp I found Patten suffering from scurvy to an alarming extent, McDonough almost unable to work, and Botan complaining. Mr. Brahé placed himself under my orders, and I united the two camps in the course of the morning. Of the camels brought down by Mr. Brahé I found three—Beer, Rowa, and Mustana—suffering severely from scab. The others were in good condition.

Monday, 29th.—At a quarter-past 5 this afternoon Mr. Becker died.

Tuesday, 30th. Bulloo.—The night passed quietly, no signs of natives being near having occurred. Early this morning Mr. Becker was buried, the stockade pulled down, and the logs used to form, as far as possible, a protection to the dead. Mr. Becker's clothes, bedding, tent, &c., being quite unfit for use, were burned, and his other effects placed in a pack for conveyance to Melbourne.

Wednesday, 1st May. Bulloo.—Saddling commenced at 6 A.M., and at half-past 10 A.M. we left Bulloo on our return to Menindie. Dr. Beckler, Mr. Hodgkinson, Mr. Brahé, Botan, and myself were the only healthy members of the party; and I did not see the utility of pushing on the dépôt to Cooper's Creek for the purpose of remaining there the few weeks our stores would last. Our cavalcade made quite an imposing appearance with its twenty-two horses and fifteen camels, and the spirits of the whole party were animated by the prospect of regaining the settled districts. Several stoppages took place during the day, from the necessity of altering the seat of our invalids or re-adjusting loads; and, to show that our departure was not unnoticed by the natives, fires sprang up at every mile of our progress until we reached Koorliatto, at a tolerably early hour in the afternoon. Patten was greatly fatigued by his ride.

Thursday, 2nd. Koorliatto.—Spelled at Koorliatto. Got up a tent for Patten.

Friday, 3rd. Koorliatto.—As I was anxious to ascertain before finally leaving the country whether Mr. Burke had visited the old dépôt at Cooper's Creek between the present date and that on which he left on his advance northward, or whether the stores cached there had been disturbed by the natives, I started with Mr. Brahé and three horses for Cooper's Creek, and reached the head waters of that creek on Sunday, the 5th, in about seventy miles, steering about W.N.W. I did not find any water throughout that distance, but crossed several fine large gum-creeks, and saw an immense number of native dogs. The remainder of the party stayed at Koorliatto.

Saturday, 4th. Koorliatto.—The party at Koorliatto got up two other tents for the accommodation of the invalids, and formed a temporary stockade of camel-saddles, &c. A black fellow visited them during the day.

Sunday, 5th. Koorliatto.—Depôt spelled at Koorliatto.

Monday, 6th. Koorliatto.—Depôt spelled at Koorliatto. McDonough and Smith became much worse, and, with Belooch, were unfit for any duty whatever.

Tuesday, 7th. Koorliatto.—The depôt spelled at Koorliatto.

Wednesday, 8th. Koorliatto.—This morning I reached the Cooper's Creek depôt and found no sign of Mr. Burke having visited the creek, or the natives having disturbed the stores. I therefore retraced my steps to the depôt which remained at Koorliatto.

Thursday, 9th. Koorliatto.—The depôt still spelling here. Simla, one of Mr. Burke's camels, strayed during the day, and could not be found.

Friday, 10th. Koorliatto.—The natives appeared again within sight of the depôt, and one walked through the camp. Mr. Brabé and myself still en route for Koorliatto.

Saturday, 11th. Koorliatto.—The depôt still spelling at Koorliatto. Mr. Brabé and myself en route for the depôt.

Sunday, 12th. Koorliatto.—Mr. Hodgkinson and Botan engaged in searching for Simla, and found that he had lain on the previous night at a place called the Doctor's Camp, a little higher up the creek. At 6 P.M. a violent thunderstorm broke over the camp, during which the absent camel voluntarily rejoined the mob. Rain continued throughout the night.

Monday, 13th. Koorliatto.—I returned to the depôt at 8 this morning, and found the country between it and Cooper's Creek to be in general well grassed, but destitute of any permanent water-supply, though, from the presence throughout my course of numerous wild dogs, pigeons, &c., there must be water accessible. The country bordering Cooper's Creek is the most miserable I have ever seen, and I am at a loss to account for the favourable impression it has made upon the minds of previous explorers. The creek itself is bordered by stony rises entirely destitute of herbage, and mud-plains so fissured as to render travelling over them when dry extremely dangerous, and so liable to inundation that it would be unsafe to camp upon them for any length of time. The natives who camped in great numbers while Mr. Brabé's depôt was there, had disappeared at the period of my visit, and but four were seen by Mr. Brabé and myself. Our horses had no water from Friday evening until last evening, when the same thunderstorm that visited the Koorliatto depôt passed over us.

Tuesday, 14th. Koorliatto.—The depôt prepared for a start, and took down the tents, &c.

Wednesday, 15th. Koorliatto.—Packed stores, &c.; the camels did not return to camp at night, as was their usual custom, the females, accompanied by Simla and Bell Sing, staying out.

Thursday, 16th, to Sunday, 19th. Koorliatto.—Looking for the lost camels, which were eventually recovered on Sunday, the 19th, by Mr. Brabé and Belooch, with the exception of Bell Sing, which camel they were unable to find.

Monday, 20th. Koorliatto.—Mr. Brabé and Smith engaged in looking for Bell Sing, but were unable to find him either on this or Poria Creek, or in the country lying between. At night they returned, and all the camels were tied up ready for starting next morning.

Tuesday, 21st. Koorliatto.—Commenced loading at 6, but did not finish till 1 P.M., the horses being a considerable distance from the camp, and the sick requiring great care in their removal. When about to place Patten on a camel, he stated that he should not feel safe upon the contrivance rigged for his conveyance; I therefore gave orders to unpack, and re-camp immediately, pitching a tent for his convenience. At nightfall only eight of our fifteen camels returned to the camp.

Wednesday, 22nd. Koorliatto.—During the night the cries of the camels were heard in the direction of Mr. Burke's camp on this creek, and at daylight they were discovered to have passed the night there. Getting them up at twenty minutes past 12 we effected another start, but had not travelled above half-a-mile before we were compelled to re-camp, McDonough, who rode on horseback, fainting from weakness. Finding the camels greatly encumbered by the carriage of the sick, I placed 3 cwt. of their loading upon the horses, which were but lightly burdened.

Thursday, 23rd. Koorliatto.—Having made some change in the disposition of the carriage of the sick, I started at a quarter past 11, and reached a sandhill twelve miles from Koorliatto, where I camped. During the day the horses were watered at a claypan filled by the recent rains. The weather, which was very cold and windy, prevented the camels from feeling any inclination to drink. A continual watch was set upon them while feeding.

Friday, 24th. Poria Creek.—Saddled at dawn. The morning was bitterly cold and very dark. Got away at a quarter past 10, and after travelling three miles passed near a large body of natives, who slunk away on observing us. Our rate of progress with the camels was very slow, Patten frequently entreating me to stop, as the motion pained him. At 4 P.M. Poria Creek was sighted, and half an hour subsequently we camped within a mile of Mr. Burke's 50th camp, keeping watch all night.

Saturday, 25th May, to 1st June. Poria Creek.—During the period thus included, the depôt remained at Poria Creek, partly in the hope of recruiting the weak, and partly to prepare for the country between here and Torowotto, as I could not hope for water between these points, unless rain fell. For a few days I had some hope of a serviceable fall of rain, as heavy clouds passed to the southward, and a few drops occasionally fell near the camp. The camels all became affected with the scab, and one of them died from its effects. I made several searches after Bell Sing without avail, and on the 28th Mr. Brabé and Botan started with the camels fit for service to take on water two days' journey towards Torowotto, and on the 31st they returned; Mr. Brabé reporting that he had deposited the water six miles north of Karriapundi Swamp, which appeared to be quite dry. While searching for Bell Sing, I several times met a small body of natives, camped down the creek, and presented them with a tomahawk in return for some fish which they gave me. Patten appeared slightly improved by his stay at Poria, and McDonough and Belooch were decidedly better. Weather exceedingly cold.

Sunday, 2nd. Karriapundi Plain.—At 4 A.M. all hands were called, and at 9 o'clock we started for our next water dependence, Torowotto, 118 miles distant. Smith and McDonough, who were much better, rode on horseback. Botan conducted the camels, and Dr. Beckler and Mr. Hodgkinson escorted Patten and Belooch, who were carried by Jambel. After great and frequent delays, caused by the necessity of adjusting pillows, &c., for Patten, the camp was pitched fifteen miles from Poria Creek. The camels were watched while feeding till 9 P.M., and then tied up.

Monday, 3rd. Karriapundi.—At 2 A.M. the camels were fed and watched, and at 8 a start effected. Patten, who fancied he could ride Simla with greater ease, being placed upon that animal, I started with the horses some time after the camels, overtaking them at 1 P.M. I learned from Dr. Beckler that Patten had been incessantly moaning since leaving the camp, and begging that we might stop. This request, with no prospect of water before reaching Torowotto, except that we had sent on, was not to be listened to, however much to be regretted; and, after attempting to console the poor fellow as far as possible, I gave orders to Dr. Beckler not to allow any delays, under any circumstances whatever. Soon after Patten became delirious, insisting that we had brought him on to kill him, and begging to be allowed to die where

he then was. Under these painful circumstances, the party proceeded till a quarter to 6, when I reached the spot where Mr. Brabé had deposited the water. I was alarmed to find that a great portion of the water had leaked out, and issued one bucket to each horse and camel. We had very little rest throughout the night, as the horses kept hanging about the water, and, at twenty minutes to 12, I ordered the camels to be loosed, in order to give them every chance of feeding. Heavy rain-clouds hung over us for many hours, and a few drops disappointed our hopes of a greater fall.

Tuesday, 4th. Karriapundi.—At a quarter to 8 started, and, travelling without stoppage till sunset, reached a spot twelve miles north of Rat Point; finding there to our great surprise a fine pool of water. Half a mile previously to reaching it, Burra, one of the sick camels, fell down, and, evidently being unable to travel, was left behind. Patten travelled in nearly an insensible condition all day. The weather was bitterly cold, and a tent was pitched at night immediately we arrived at camp for his accommodation. The feed was very luxuriant, and the camels were allowed to remain loose all night.

Wednesday, 5th. Rat Point.—The unexpected meeting with water induced me to delay a little this morning, for the purpose of giving all those desirous of doing so the opportunity of a good wash, and it was twenty minutes to 11 before a start was effected. While saddling, an unusual number of native dogs were noticed hunting round the water, and regarding the camels with great curiosity. My intention on leaving camp was to camp at Rat Point, as I confidently expected to find water in the hole I had previously discovered when leaving Torowotto. On arriving at the spot, however, so circumscribed was the area covered by the late rainfall, I found no traces of water, and camped 5 miles nearer Torowotto. Patten was all day insensible, and unconscious of any change in his position.

Thursday, 6th. Mud-Plains.—At 4 A.M. it was found that Patten had died during the night, and Mr. Brabé and myself dug a grave for him by firelight. As soon as his funeral could be performed, the party started for the hole dug by Dr. Beckler and Mr. Hodgkinson during their stay at Rat Point, and reached it at 1 o'clock, finding abundance of water in the vicinity.

Friday, 7th. Torowotto.—A great improvement was discernible in the health of the men. Smith, Belooch, and McDonough, the former especially, were able to work a little, and Botan was the only man in very bad health. At an hour before sunset the horses reached Torowotto, but not a drop of water could be found in any part of the swamp. This was a great disappointment, as I had certainly calculated upon finding a supply, and was unwilling to send the camels backward and forward as water-carriers. There was a strong probability of rain from the appearance of the sky, and during the evening and night sufficient fell to afford us a tolerably good stock of water.

Saturday, 8th. Torowotto.—Spelled at Torowotto. Put up two tents for protection against the rain, which fell intermittingly throughout the day.

Sunday, 9th. Torowotto.—Spelled at Torowotto. Packed up for a start. Intermitting showers throughout the day.

Monday, 10th. Paldromatta Creek.—Started at twenty-five minutes past 9 A.M. Camped at Paldromatta at a quarter to 8 P.M. No water in the creek, but passed a little on the road.

Tuesday, 11th. Wannaminta.—Started at fifteen minutes past 8 A.M.; travelled sixteen miles, and camped at a claypan near the creek, which was erroneously named Teltawinge in the first part of the diary.

Wednesday, 12th. Wannaminta.—Started at 2 P.M. with the camels, as they strayed during the night. Met some natives who had accompanied Mr. Burke to Torowotto, and accepted their services as guides to a shallow rocky water-hole, eight miles from our last camp.

Thursday, 13th. Teltawinge.—Started at a quarter to 10, and reached

water in Tirltawinge Creek, formerly marked on the diary as Wannaminta, at 4 p.m. Tracks of kangaroo abundant, whence the name of the creek, Tirlta signifying kangaroo. Not expecting water at the next creek (Nuntherunge), I had a couple of bags filled for a supply. The natives remained near us, and were very solicitous to assist us.

Friday, 14th. Nuntherunge.—On leaving Teltawinge I made several presents to our black friends, and took one of them, a youth of some fifteen years of age, on with the party. We reached Nuntherunge at an early hour in the afternoon, and found the bed of the creek quite dry, but, by sinking a couple of feet, obtained sufficient water for camels, horses, and bathing purposes. Splendid feed on the creek.

Saturday, 15th, to Friday, 21st. Nuntherunge.—After camping at Nantabulla or Hobson's Basin, and Wotwinge—two gorges amply supplied with water, in the Motanie Ranges—I proceeded to Batoja; and finding no water there, and only sufficient for the camels at Bilpa, pushed on with the horses to Cookerega, or Kokriega, from whence, after remaining two days, I reached the Darling on the 18th instant; the camels arrived on the following day. Experiencing heavy rain-storms at Bilpa, and between Cookerega, or Kokriega, and the river, I established the depôt camp in its former situation at the junction of Panamoroo Creek with the Darling. I had the honour, on the Friday following, to despatch Mr. Brahé with a summary of this diary, and Mr. Burke's despatches, addressed to the Committee; and I trust that the celerity with which I forward the messenger will be sufficient excuse for its imperfect compilation and clerical deficiencies.

W. WRIGHT, Officer in Charge.

William Brahé's Report.

(Received 1st July, 1861.)

To the Hon. Secretary, Exploration Committee, Melbourne.

Melbourne, 30th June, 1861.

SIR,—I have the honour to report to you, for the information of the Committee, that on the 16th of December last Mr. Burke gave me charge of the depôt formed by him at Cooper's Creek, and started for Eyre's Creek, *en route* for the Gulf of Carpentaria, at 6:40 A.M. on the same day. His party consisted of himself, Mr. Wills, King, and Gray. He took with him six camels and one horse. The party was provided with provisions for twelve weeks. I accompanied the party for a distance of twenty-two miles along the water-course of the creek. The party remaining at the depôt consisted of myself, Patten, McDonough, and Dost Mahommed. My instructions, received by word of mouth, were to remain at the depôt three months, or longer, if provisions and other circumstances would permit. I left the party at 4 o'clock P.M. on the same day and returned to the depôt. On the following day, the 17th December, we commenced cutting timber, for the purpose of erecting a stockade.

22nd December.—Natives, about twenty-five in number, approached the camp, but I considered it advisable not to allow them to come near the tents.

30th.—On several days during the week were annoyed by number of natives. On Wednesday they succeeded in stealing six camel pack-bags, which we had washed that morning and spread out on the turf on the water's edge to dry. The thief, by keeping under shelter of the high bank, escaped unobserved. Noticing the loss only late in the afternoon I did not think it advisable to go in pursuit. During the night of Thursday I observed two blacks within a hundred yards of the camp, but on my shouting to them they ran off. On the 23rd finished the stockade, 20 by 18 feet, and put up Mr.

Burke's tent within it. In this tent I kept the ammunition and firearms. From within the stockade we had the other tents and the camels, which were kept tied up at night, under cover of our guns.

31st.—Observed some blacks stealing stealthily along the bank of the creek towards the camp, while one directed them from behind a big tree. I allowed them to come to within twenty paces of the camp, when suddenly I called out to them, we at the same time firing off our guns over their heads. They seemed much frightened and hardly able to run away. Great numbers of blacks camped near us.

6th January, 1861.—A large number of natives came to the camp, whose demeanour roused my suspicions. Got hold of a young native and shoved him off, when he fell down. In the afternoon the whole tribe returned, the men armed, some with spears and some with boomerangs: most of them had painted their faces and bodies. I met them at a short distance from the camp; and, marking a circle round it, I gave them to understand that they would be fired at if they entered it. On some of them crossing the line I fired off my gun into the branches of a tree, when they retired, and did not molest us any more.

24th December [sic].—I should like to explore the neighbourhood a little, but cannot safely leave the camp for longer than three or four hours; one of the men looking after the camels the greater part of the day, while the other is away from four to five hours daily to prevent the horses from straying. I should have mentioned that I had charge of six camels and twelve horses, two of the camels very scabby. Grass is getting very dry and scarce near the camp. We are obliged to hang all our stores on boughs of trees to protect them from the rats, of which we killed about forty every night for some time.

26th February.—I rode up a conical hill bearing north-west by north from the depôt. It is distant about nine miles, and one of a chain of hills running north-east and south-west. From the top of this hill I saw another range, distant about fifteen to twenty miles, much broken and considerably higher than the one I was on. The country between the two is stony, like that between the first range and the depôt.

1st March.—Natives less numerous. Looking out anxiously for Mr. Burke's return. One day I took a ride up the creek which joins Cooper's Creek opposite our camp, coming from E.S.E., following it up about six miles, and found bed and banks thickly timbered with myall. The country in that direction is very stony. From the top of a stony rise I saw a low range running east and west, distant about fifteen miles. Blacks passing now and then, offering us nets and fish; we made it a rule never to accept the least thing from them, but made some of them little presents, as left-off clothes.

15th.—About twenty-five natives with their families passed here last night on their way up the creek, offering nets and fish. They gave me to understand that there would be plenty of water in the creek shortly, and that we might swim on the flat the stockade was on.

1st April.—During the first twenty-four days of March the heat has been greater than might be expected for the season, and especially the nights were intolerably sultry, a great deal more so than the warmest of January. On the 24th there was a sudden change: it began to blow hard, the nights became very cool. On the evening of the 29th we observed lightning in all quarters, and heard thunder in the north. A slight shower of rain fell between 8 and 9 o'clock P.M., and another on the following morning, not sufficient, however, to lay the dust. The blacks stole a camel pack-saddle from us on the 27th, while I was away from the camp. They carried it about a mile down the creek, where Patten overtook them and recovered the saddle, but it was torn to pieces.

4th.—Patten commenced shoeing the horses, lest he might become incapacitated by disease, as he felt very unwell.

Patten, after shoeing two horses, was obliged to take to his bed, suffering acute pain, and was not afterwards able to move about.

15th.—Patten is getting worse. McDonough and I began to feel alarming symptoms of the same disease.

18th.—There is no probability of Mr. Burke returning this way. Patten is in a deplorable state, and desirous of being removed to the Darling to obtain medical assistance, and our provisions will soon be reduced to a quantity insufficient to take us back to the Darling, if the trip should turn out difficult and tedious. Being also sure that I and McDonough would not much longer escape scurvy, I, after most seriously considering all circumstances, made up my mind to start for the Darling on Sunday next, the 21st. The horses have lately got into the habit of straying; missed five of them a few days ago, and found them about fifteen miles from the camp. Last Monday we had a welcome rain for the first time since 8th December (except some slight showers on 24th and 25th March). The last three days have been fine and cool, but now it again looks like rain, although the barometer is very high—higher, indeed, than it has been during our stay here.

21st.—Left the *dépôt* at 10 o'clock A.M., leaving 50 lbs. of flour, 50 lbs. of oatmeal, 50 lbs. of sugar, and 30 lbs. of rice buried near the stockade, at the foot of a large tree, and marked the word "dig" on the tree. I took 150 lbs. of flour, 75 lbs. of sugar, about 70 lbs. of oatmeal, 1 bag of rice, 4 lbs. of tea, and a small quantity of biscuits. Taking into consideration that we would be obliged to travel slowly on account of Patten, and on account of the scarcity of water which I calculated to have to contend with, and would probably be on the road to the Darling at least six or seven weeks, I considered that I could not take less provisions. Patten was placed on a quiet camel. We travelled very slowly, and halted at 5 o'clock P.M., having made about fourteen miles.

22nd.—Started at 8 o'clock, and reached Camp 63 (Rat's Hole) at 11-30 A.M., finding the frame of a camel pack-saddle stuck in a tree. We had put away the saddle in some bushes when we abandoned the place on account of the rats, but the natives had found it. Halted at Camp 62.

23rd.—Were visited by about seventy or eighty natives, some of them old acquaintances. Threw away a bag of camel-shoes to lighten the burthens of the two sick camels. Travelled twenty-eight miles, and halted at Camp 60. Splendid grass in bed of creek.

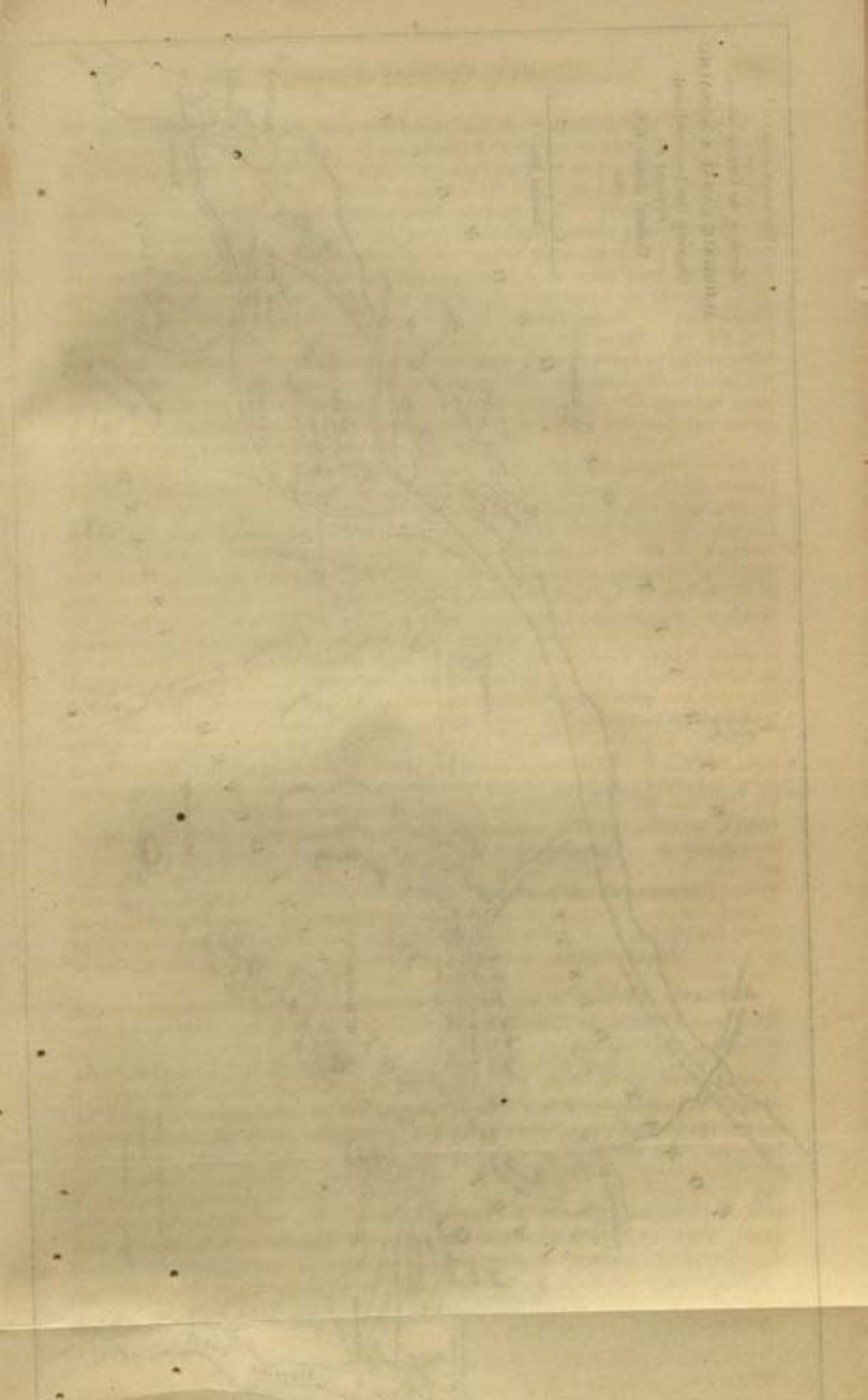
24th.—Filled two pair of water-bags with water, and started for Bulloo at 12-30 P.M., going E.S.E. Finding a little water and plenty of good grass, halted at 5 P.M. Was compelled to throw away nine pair of water-bags to be able to carry water. Finest country in the neighbourhood of Cooper's Creek.

25th.—Started at 8 A.M. From eleven o'clock passed over very stony country. Three o'clock, stony range. Halted at 6-15 P.M., between ranges without water or grass.

26th.—Having kept a careful watch over the camels and horses, we were enabled to start at 6-30 A.M. Till 11 o'clock very stony and scrubby country to pass over. When clear of ranges, followed an E.S.E. course, crossing several creeks without water running; south-west bank of creeks thickly timbered with gum. The creeks looked likely to contain some water, but pushed on without searching for it. At 3 P.M. came upon sandy, well-grassed and thinly-timbered country; saw a variety of birds, as pigeons, crows, &c.; halted at a creek, probably McDonough's Creek. We had to watch our cattle closely the whole night, as want of water made them inclined to ramble, and they showed no inclination to feed.

27th.—Started at 6-4 A.M., taking an east by south course, as the appearance

THE
GREAT
OCEAN



Vancouver Island

*Sketch of the Country between
ALBERTIE CANAL & NANAIMO,
Showing the Line of Road,
Proposed by
Comm^d Mayne, R.N.
1863.*



of the ranges to the north and north-east led me to believe that I had kept rather too much to the south. I continued on this course till 9 A.M., when I got a glimpse of a high ridge, which I recognised as the western boundary ridge of the Bulloo Plains. Went east till 10 A.M., then east by north, and arrived at the Bulloo Creek, at Camp 52, at 1.45 P.M. When crossing Mr. Burke's old track I noticed fresh tracks of horses and camels going in different directions, which were not more than ten to twelve days old, and I conjectured that the party left at Menindie had been at Bulloo, or were there still. As I could not expect to find water down the creek, I followed up our old track, knowing that there must be water in a large channel which we had passed on our way to Cooper's Creek, about five miles from Camp 52. At 4 P.M. I reached several small but deep water-holes with plenty of water, and camped there. We had much trouble to keep the horses from plunging into the water, most of them having had no water for exactly 100 hours. I decided upon remaining there the whole of the following day, not only to refresh the cattle, but also to search for traces of the Darling party.

28th.—Went very early in search of the horses up the creek. At about daylight I got in sight of them, at the same time observing smoke rising within 300 yards from me, and near the horses. There was not light enough to see well, and I thought I had dropped upon a camp of natives, and resolved to try to obtain some information from them respecting the Darling party. After going a few yards farther, I saw to my great surprise a European advance towards me. It was Mr. Hodgkinson. He led me to Mr. Wright's camp; and after bringing in our party, with horses and camels, &c., I placed myself and party under the orders of Mr. Wright.

I have the honour to be, Sir,

Your most obedient servant,

WILLIAM BRAHÉ.

XXVII.—*Route in Exploring a Road from Albernie Canal to Nanaimo, in Vancouver Island, in May, 1861, with a Track Chart.* By Commander RICHARD C. MAYNE, R.N., F.R.G.S.

[Communicated by the LORDS COMMISSIONERS of the ADMIRALTY.]

Read, May 12, 1862.

To Captain G. H. RICHARDS, R.N., F.R.G.S., H.M.S. *Hecate*.

SIR,

H.M.S. *Hecate*, Vancouver Island, May, 1861.

I HAVE the honour to inform you that, in compliance with your orders, I left the Albernie settlement at 10 on the morning of the 29th of April, with six Indians, one man from the *Hecate*, and Mr. Bamfield, the Indian agent. After crossing the low coast-ridge we passed over about 2 miles of level land, and then commenced a gradual ascent, and continued to ascend till we camped,—our camp being about 800 feet above the sea. During the latter part of the day the old hunter, who was the leader among the Indians, had been edging more to the northward than I liked; and I explained that we wanted to pass between Mounts Arrowsmith and Moriarty, and pointed it out on the chart to him. He insisted that if we went that way we should have to cross snow mountains,

he having been there hunting; and he said he knew a way farther north by which we could get into the valley beyond the "steep ridge," though farther than that he did not know. Having satisfied myself that he did not mean to go by "Horne Lake," I agreed to let him pilot, as the Indians showed great reluctance to trying the southern way, and some desire to return at once, and I knew it would be easier to make them go my way returning. As it turned out, it was fortunate we did not try that way, for I afterwards found Arrowsmith and Moriarty are joined by a snow-covered ridge: and if I had had to turn back, the Indians would have been so disheartened that I probably should not have been able to get them to try again.

Next morning (30th) we continued to ascend for an hour, when we reached the summit of the ridge, about 1200 feet above the sea. The whole of this ascent had been by a very easy grade; nothing to prevent a road being led straight up it; and I found on returning that even then we did not cross in the lowest part of the ridge, which might have been passed at an elevation of 700 or 800 feet, if not less. We descended on the north side somewhat more abruptly, and at the bottom came to a good-sized stream, 30 or 40 yards wide, running to the northward, which I called "Elk River." Crossing this we walked along a lightly-timbered level land, here and there rather swampy, for 3 or 4 miles, when we came to a small lake, about 3 miles long, and lying east and west, into which the Elk River empties itself. The soil from the mountain foot appeared very good, and the elk are numerous; we saw upwards of a dozen, and shot one, without going out of our course.

Arrived at the lake, the Indians' knowledge of the country ceased; none of them had ever seen this lake before, and they gave up all charge. One old fellow expressed great disgust with my compass, because it could not tell me where the high mountain (Arrowsmith) was; but as I confidently asserted I knew the way to Nanaimo perfectly, they were content to go on. We walked along the south shore of the lake about half its length, and then camped, and made a raft to continue our journey on.

I was at this time uncertain if the lake did not extend farther than we could see, as there appeared a gorge in the south-east corner; and as it caused no delay in making, I thought a mile or two on the raft would rest the Indians, who were pretty heavily laden. We found next morning that the rafting saved us an awkward struggle over two bluffs which we came to about half a mile farther on, and which projected perpendicularly over the lake, extending over 100 yards each, and 150 feet high; and though the bluffs themselves are not more than this height, it is very steep up to the summit of the mountain in this part.

I have mentioned these bluffs in my letter to the Governor from

Nanaimo (a copy of which is annexed to this) as the greatest, or, in fact, the only obstacle to the road between Albernie and Nanaimo. In that letter I stated that I thought it possible a more careful examination might enable an engineer to carry the road over these without blasting; a second visit, however, has led me to alter this opinion, and I now feel sure some blasting, though I could not say how much, would be required if a road (waggon) were being constructed; but a trail might be made to pass over them. I now think that the engineer constructing the road might prefer the north side of the lake to the south; as, though generally the mountain comes steeper down to the edge on that side, and there did not appear to be so much of a beach as there is on the south side all along, except at these bluffs, I did not see any such positive impediment as the bluffs present, and there may be level enough to carry the trail along.

At the head of the lake, which we found did not extend farther than we had seen, there is a small hill, which I at first took for "Solitary Hill," over the top of which we crossed, and then ascended the higher ridge behind it, as shown by the red line on the accompanying tracing. My object in keeping up was to get sight of Texhada Peak, or some other point to fix my position; but the road would be brought into the lake through the wide gorge in the north-east corner, through which a large river, 40 or 50 yards wide, runs from the lake to the northward. I was disappointed in the hope of obtaining any bearings, as between the incessant, or almost incessant, rain, and the mists over the gulf, we could see nothing, though several trees were ascended for the purpose. Descending on the north side of the ridge, we shaped an easterly course along the level land at its foot. It was 1 P.M. on the 1st of May when we reached the bottom of this ridge; and from that time till we made the sea at the head of North-west Bay the same hour on the 3rd, the country over which we travelled was perfectly level, in most places thinly timbered, and with a few patches of swamp. The nature of the soil varied considerably. In some places we passed over many acres of a black vegetable mould, free from stones; while others, though certainly the smaller proportion, were hard and sandy, and covered with stones. There was much less undergrowth than I have been accustomed to meet with, which was a considerable relief, though probably owing more to the earliness of the season than to anything else; a month later would make a considerable difference in this respect. The generality of this country, however, appeared as if it was never very thickly covered, and was well adapted for settlement. In speaking of all this as level, I must except a couple of gorges mentioned in my former letter, about 100 feet deep, through which run two rivers, 50 or 60 yards wide.

At 1 P.M. on the 3rd, as I have said, we opened the sea about half a mile off, and I found, to my disgust, that I was much farther north than I thought. I had imagined, by keeping easterly from the lake, we should have passed behind (south of) the hills south of Nanoose. At first I attributed it to bad steering since leaving the lake, but when I got bearings on my return journey I found the mistake was on the other side: I had put the lake too far south.

After making the sea we steered south, to avoid Nanoose Harbour, and at 3 came out at the head of it. As I intended passing behind the south Nanoose hills on my way back, I did not press the men, some of whom were showing signs of being knocked up, to go behind them now, as they were very anxious to go round the beach, and then cut straight across to the eastward of the hills. Accordingly we walked along the beach to the long point beyond Entrance Island, and camping there for the night, took to the bush in the morning (4th), and reached Departure Bay at 3, and Nanaimo at 5 P.M. on the same day. I was again misled in steering for Nanaimo, by the two small lakes being marked much too far south. When I reached them I laid off my course for Nanaimo on the chart, and instead of coming out there I came out in Departure Bay, 3 miles north of it. The country between Nanoose and Nanaimo is fairly level; and though in some places there is a good deal of fallen timber and one or two small swamps, a road might easily be made along it.

I remained at Nanaimo two days to recruit the party, and sent from thence the original of the annexed letter and a tracing of my route, approximately half an inch to a mile (nautical), to his Excellency the Governor. My route is a good deal altered in the one I have now prepared, having corrected it on my way back. On my way to Nanaimo, as I have said, the increasing rain prevented my seeing anything whenever I did get on high ground, and I had to be guided wholly by compass course and estimated distance.

When I mustered my party to prepare for return, I found three of the Indians quite unable to go. One had been ill from the first, and was nearly turning back from the first day's walk; the other two had such swollen feet and legs that I saw they would be more hindrance than help if I took them into the bush. These Indians are not used to travelling, as those on the main are; for the difficulties of this travelling are not to be compared to my last trip in British Columbia, when none of the Indians were done up. The only thing to be done was to start with the other three, as we could not then get any Nanaimo Indians to go; and we accordingly prepared to start, leaving everything but the blankets and six days' provisions with the sick, to be brought by them across the Qualicum trail as soon as they were able to move. At the eleventh

hour, however, Mr. Horne got a Nanaimo Indian to go with us to show us as much as he knew of his part of the country: when he agreed to go, two others asked to accompany him; and at last all three wanted to go all the way. As the provisions were as much as the three Albernie Indians could carry, and Mr. Bamfield and I were packing our own blankets, instruments, axes, &c., I was not sorry to take the Nanaimos, and gladly unpacked myself, and added a bag of flour to our provisions, so that we were safe for ten or twelve days.

We got away at noon on Tuesday (7th), and followed up the Mill Stream and along Pearse Plain till 6, when we camped at the western entrance of the clear land, and on the east bank of the Mill Stream, or Millstone River, as it is sometimes called.

I marked, on the tracing sent to the Governor, the track I intended endeavouring to pursue on my way back to Albernie, which was nearly that proposed by you on the outward journey, and marked on the tracing you sent to his Excellency, that is to say, passing between Mounts Arrowsmith and Moriarty. When I passed the small lakes on Saturday, I ascended the knoll over the eastern one, and from that I saw the land north-east of Mount Benson was very clear for several miles—or perhaps I should say lightly timbered, rather than clear—and at the same time that there was a ridge east of Benson, which must be passed to the northward. Accordingly we steered so as to cross the good land and ascend a middle ridge, which I had seen between the south Nanoose Mounts and the one due west of Benson Mount, to get some bearings, and if possible to see also, as the weather was now fine and clear, whether there was a valley between the two snow peaks (Moriarty and Arrowsmith), or if it was, as the Indians said, snow-covered from one to the other. We kept about west all day, skirting the south side of the south Nanoose Hills, keeping above the valley, through which runs the Nanoose River. At 3 p.m. we descended, and crossed the Nanoose River, here about 30 or 40 yards wide, and continued along level land till night.

Next morning (9th) we ascended the ridge on the west side of the Nanoose River, and reached the summit at 8, and by getting up a convenient tree I got the desired bearings. Finding by them that I was again farther north than I wished to be, I kept along to the ridge to the south-west, till at 9 we came to a clear bare nob, from which we had a splendid view of both Moriarty and Arrowsmith; and, alas for the direct route! an equally clear view of a ridge about 2000 feet high joining the two. The Indians, of course, chuckled immensely when we saw this proof of their superior knowledge, and the old hunter said we should be up to

our necks in snow if we tried to cross it. I had, however, not the slightest wish to try the experiment. I saw at once that it would be quite useless as a road-way even if we succeeded in crossing it, and I determined to return by the lake; but, instead of going down on to the level land again, to keep the ridge, correct my chart, and get a better idea of the lay of the land. We crossed the eastern of the two large rivers at 10, and the western one at 4 P.M.; the gorges of both of these streams were much deeper here than where we had crossed them below, and the rivers deeper. We had great difficulty in fording the second one. At 9 the next day (10th), having kept a little northward, we met one of our old marks at the southerly bend, marked on my outward journey, and imagining we were nearly up to the lake, kept to the south-west, to get on the summit of the ridge, which we reached at 4, and saw the opening of the lake beneath us. Descending the west side of the ridge, we reached the end of the lake at 6. We found the timbers of the raft lying on the beach, and soon put it together again. Next morning (11th) we started on the raft, and went the whole length of the lake with it, reaching the west end at 10; it took us a little longer than walking, but the rest to the Indians was worth the delay. At 10 we started along the Elk River, and by keeping its west bank avoided the swampy ground we had passed before, and at 1 reached the foot of the ridge.

We were not so fortunate with respect to the elk as when going; for though we saw lots of fresh trails, we were disappointed in not getting a shot at one, and had to content ourselves with the remains of the pork, we had kept on purpose for frying the elk with, for our breakfast; which was the more annoying, as we had all along bargained on getting an elk when we crossed the lake. I determined, instead of going through the gorge, to cross the east summit of the ridge, so as, if possible, to catch a glimpse of Mount Arrowsmith, which I had not seen since the 9th, when on the other (north) side of the lake. We ascended, keeping well to the south, and reached the summit at 2. We then continued along the ridge, and just when we were beginning to descend, and I had almost given up the hope of seeing anything, we came to a clear spot, and saw Mount Arrowsmith, as it is seldom seen, perfectly clear to the very top. From this we kept south-west, and descended the ridge by almost as easy a slope as we had ascended it by when setting out on the 29th-30th, followed the small river which runs into the Somas about a mile above the mill, and camped about 4 miles from Albernie. Next morning we proceeded down the hill, and reached the settlement at 10, coming out on the beach about half a mile below it.

I have marked my track both ways on the inch-scale sheet of the

coast, and filled in as much topography as I am able. I have made a tracing of this, according to your orders, for his Excellency the Governor.

I have marked on the tracing the route I think it advisable a road should take if one is cut. I mentioned, in my letter from Nanaimo to the Governor, the advantages the northern, or coast-route, appeared to me to possess over the more direct one, before I knew the direct one to be impracticable; and it is needless repeating them now we know that no direct valley exists, and that, if another way be required, it must be sought for southward of Mount Benson, and towards the entrance, rather than the head, of the Albernie Canal.

I have marked a proposed line nearer the coast than I myself passed. I imagine this will be found preferable, as the river gorges mentioned will probably be found considerably less steep near the shore than higher up, as I have mentioned I found them much steeper, and the streams deeper, when I crossed the second time than at the first. You will see I have drawn the proposed line by two ways from Nanoose to Nanaimo, because as a matter of expense or difficulty in cutting I believe there would be found little or no difference between them, as they would take advantage of all the clear land to the western extreme of Pearse Plain in either. The southern one would open up the largest tract of available land, the other Nanoose harbour, though the southern might by a little deviation be made to do this also. The choice of these, therefore, appears to be entirely a question of colonial policy—whether his Excellency deems it most advantageous to the colony to take it through the valley of the Nanoose River, in which there is considerable available land, or bring Nanoose more prominently forward, and have this magnificent harbour for loading and unloading vessels.

There is one other consideration, which is the line the Colonial Surveyor has determined on for the road between Nanaimo and Victoria. If he intends bringing it into the south-west of Mount Benson, through the valley of the Nanaimo River, as he will probably have to do, the southern road will for about 10 miles answer as the commencement or termination of the Victoria road; and you well know that in this country a mile of road represents a considerable sum of money.

In conclusion, I must thank Mr. Bamfield for the assistance he rendered me by his knowledge of Nootka language.

I have, &c.,

RICHARD C. MAYNE, R.N.

XXVIII.—*On the Isthmus of Tehuantepec.* By
HERR M. G. HERMESDORF.

THE Isthmus of Tehuantepec is approached from the Pacific Ocean by the Bay of La Ventosa, situated between $16^{\circ} 11' 36''$ and $16^{\circ} 12' 49''$ N. lat., and $95^{\circ} 13' 26''$ and $95^{\circ} 15' 52''$ long. w. from Greenwich. The harbour, or rather the roadstead, is formed by a promontory of yellow rock, called Terro Morro, rising abruptly from the sea, and affords shelter from westerly winds, but is otherwise quite exposed. By building a breakwater about half a mile long, from the promontory into the sea, I should think landing would be rendered quite safe. I never heard that any life was lost in landing, but I reckon very few persons get on shore without taking, *nolens volens*, a shower-bath, on account of the heavy surf. On my arrival in La Ventosa, in April, 1857, there was only one shanty; but the late Louisiana Tehuantepec Company have since erected several buildings, which are already falling into decay, and the place seems doomed to become again as quiet and dreary as it ever was before. The port has been declared open, but there is, in fact, very little trade. A piquet guard, of some 20 soldiers, accompanied by as many women, are generally stationed here.

Along the coast, in a westerly direction, various hillocks project into the sea, forming coves; and in the same direction, at a distance of a few miles, is located the Salina de Santa Cruz, where, in dry seasons, quantities of salt are made by solar evaporation. The little bay of Santa Cruz is pronounced a safer harbour than La Ventosa. About 60 miles farther westward is the harbour of Huatulco, which used to be the seaport of Oaxaca when Mexico was under Spanish domination, but now-a-days it is quite abandoned; in the course of the whole year it is scarcely visited by more than a few little craft.

Eastward from La Ventosa the country is a low sandy plain, covered with brushwood. At some distance begin lagoons, spreading under different denominations and shapes upwards of 50 miles distant, being connected with the Pacific by a small channel, called Boca Carra. These lagoons are full of shoals and quicksands, and can only be navigated by canoes; they are, besides, renowned for the great quantity of shrimps, fish, tortoises, alligators, and aquatic birds. The lagoons form together a great many islands and peninsulas, where game, as deer, hare, &c., are found in immense quantities. The inhabitants are Indians, descending from a tribe called Huaves. The coast, all the way down to Guatemala, is very low, and intersected by *esteros*, or

creeks, which can be navigated by canoes; but there is no harbour between this and Istapa, or, as it is more frequently called, San José de Guatemala, distant from La Ventosa by sea about 300 miles, and by land 390 or 400 miles.

An undulating plain, of alluvial soil, with some singular and prominent mountain-peaks, covered with light timber, extends to the northward for a distance of upwards of 40 miles. This plain is bounded on the west by several mountain ranges, and on the north by the Cerros Prieto, Masuatsa, and their easterly prolongations. In an easterly direction it is partly bounded by the lagoons; and farther east it is interrupted by the Sierra Madre, which approaches the Pacific at a distance of 20 miles. The whole country, seen from the summit of a hill, looks, with little exception, like a continuous forest; and the buildings and fields under cultivation are so embowered in shrubs that they can hardly be discerned. The soil is a loam, unmingled with sand; and the most prominent feature of the vegetation is a cactus. It grows as a tree, of 2 or 3 feet in diameter, and 7 or 8 feet high; and then, branching out into smaller columns, similar to a candelabra, bears a palatable fruit, called *pitava*. In some parts are large groves of palm-trees, and all over the plain sandal and logwood are found, but not in great quantities. A number of rivers and streams descend from the mountains, draining the plain in various directions. The part beyond the Cerro Prieto presents quite another appearance. It is about 800 feet higher, and forms almost a continuous body of broken upland, prairies, and highlands, with occasional small valleys, fertile spots, and clumps of bushes and trees. Over a great part a little soil, lying on a calcareous or slate tufa, supports a vegetation of grass, affording pretty good pasture. A portion of these plateaux is covered with palm-trees. The whole is drained by the Amalaya and Hochapa creeks, and by the Matatengo, Pashiné, Mongône, and Terabie rivers, besides a large number of smaller creeks. The belt eastward from La Urivela is connected with the Pacific plain by the *portillo* (gap) of Tarifa. Northward the plateaux extend towards the La Puerta River, for a distance of 40 miles. Three miles from the La Puerta the country begins to be covered with densely-wooded forests, and continues to be so for upwards of 48 miles. From the mouth of the Jaltepec river, 25 miles from the La Puerta, the country is very low, and subject to partial inundations from the Goatzacoalco and Jaltepec rivers. This level is interrupted by the Encantada mountain and some other ranges of hills, approaching the river Goatzacoalco from the west. At the hacienda of Almagro, 12 miles from Arayucan, and about 40 miles from Suchil, commences a moderately elevated table-land, partially wooded. Farther north are llanos, alternating with occa-

sional patches of timber, extending many miles in a northerly and westerly direction. Towards the Gulf of Mexico the surface of the country is very undulating, and the soil gravel and sandy loam, the hills being sometimes sparsely covered with a stunted growth of trees and bushes. The strip skirting the Goatzacoalco River is a rich sandy loam, sustaining a dense growth of vegetation, and susceptible of profitable culture. Several large villages are situated in this portion, inhabited mostly by Indians, principally devoted to agriculture and stock-raising. Bordering the gulf is a strip of land, composed of sand-hills and low bottom, affording good pasture and separated from the mainland by a river. The east part is considered healthy, and is often visited by invalids to recruit their health. The east side of the Goatzacoalco, from the Uspanapa river, consists of a level plain, alternating with gently undulating hills, approached by high lands, which commence near the east side of the river, at Paronuevo. The greater part of the low plain is liable to be overflowed. The road from Minatitlan to Tabasco leads through this district, which is considered as rich and fertile as any other in the country. The portion between the Uspanapa and Choachapa rivers is formed by several extensive *patreros*, intersected by timber; the whole subject to inundations. Farther south the surface is more broken and hilly, covered with a dense forest, extending to the Chimalapa mountains. The highest ridge of these mountains—upwards of 40 miles from the Pacific Ocean—forms the dividing line between the two oceans. They are united, south-east, through the Guinata mountain, with the Sierra Madre, which latter follows its main direction down to Guatemala; westward, the Chimalapa mountains are connected, through the Cerros de Albrisias, Convento and el Portillo de Tarifa, with the Cerros Piedra Parada, Espinosa, Masahuata, and Prieto; which mountains form the dividing ridge of the two oceans for the central part of the Isthmus. Through one of the gaps which are formed by the latter mountains, the railroad must pass, if ever one should be constructed through this Isthmus. The Guirhilona mountains—which are linked with the Cerro Prieto, through the Portillo of Chivela—connect farther west with higher mountains, extending in various directions over Mexico.

The whole republic of Mexico presents no river which is navigated by steam, but several could be rendered fit to carry small steamboats, drawing from 18 to 24 inches of water. The most important river in this part is the Goatzacoalco, which may be considered as the father of all the others. The denomination Goatzacoalco stands, in the idiom of the natives, for the word snake; and the river, being in its whole length very crooked, well deserves that name. It collects its waters on the northern slope of the

Chimalapa mountains from several branches, of which the principal is called El Corte. After being joined by the Chimalapilla, and 1 mile lower down by the Milagro river—both coming from the north-east—the course is south-west. The banks are picturesque; in one place a projecting rock presents the form of an alligator. In descending farther, three tributaries enter the main river by the left bank. The first of these is the Milagro, 3 miles lower down; the second is the Iscualapa; and the third is the Cayoltepec, about 6 miles from the latter. At the confluence of the said Iscualapa River, the mean direction becomes north-west. The Goatzacoalco has in the upper part of its course a great number of *rendales* (rapids). Many of them are strong and dangerous. Nineteen miles below Malatengo river is the mouth of the Serabia river. In the immediate vicinity is Malpaso, formerly of some note, having been for a number of years the only place of embarkation and debarkation for all goods and products fetched across the Isthmus. Diagonally opposite to this place, on the right bank of the Goatzacoalco river, is the site of a colony, established in the year 1823, by French settlers, but long since abandoned. Now-a-days there exists no other settlement higher up the river than Suchil, distant 21 miles from the confluence of the Serabia. From here down, the river-banks begin to be a little more lively. Several *monterias* have built their dwellings alongside the river; and some farms and villages are either in progress of erection or already erected. The nearest permanent settlement from here is La Vacaqueña, a *ranchito* and *monteria*, owned by a Spaniard. The river forms—close to the habitation, which is situated on the left bank—a very troublesome passage for canoes and rafts at low-water. About $1\frac{1}{2}$ mile beyond, 14 miles from Suchil, by the river, is Brewer's Place, owned by an American lady, widow of a French gentleman. She possesses a pretty large stock of cattle, and cultivates vegetables and fruits, to be sold in Minatitlan. At a place called La Horqueta, about 40 miles from Minatitlan, the river branches and forms a large island. The main arm turns to the right, and the other, after having made a large bend to the west, joins the main branch again, 13 miles from Minatitlan. Several Indian settlements and corn-fields are situated on the banks of the western branch, called Brazo Mistan. On the other branch, called Brazo Apogongo, lie several ranchos, surrounded by patches of cultivated land. Descending farther the right shore of the river is flat, and liable to become temporarily inundated. Two considerable tributaries—the Uspanapa and the Choachapa—flow in here by the right bank. The banks exhibit the same characteristics for nearly the whole length of the river. Sometimes they are sloping; but more generally, particularly in the upper and middle region, both banks are

studded with luxuriant forests, with varied shades of green. When the whole bed of the river is filled with water, it assumes a most beautiful aspect. In some parts snags are very numerous, and the water is shallow and intricate; but, nevertheless, it could be made navigable for light-draught steamers as far as Malpasa, and even higher up. The mouth of the river is situated in $18^{\circ} 8' 20''$ N. lat., and $94^{\circ} 32' 50''$ long. W. from Greenwich; and its length may be estimated at upwards of 200 miles.

The next most important of streams is the *Uspanapa*, taking its rise in the unexplored region of the Chimalapa Mountains. It is navigable for a long distance, and has a great many *monterias* in its vicinity. At a distance of 18 miles from its mouth, on its right bank, some French emigrants commenced a colony in the year 1823, but it has long been abandoned. Notwithstanding the favourable character of this river, there exists no other settlement on its margin than a few *ranchos*. The river joins the Goatzacoalco 3 miles from Minatitlan.

The *Choachapa* is another tributary to the Goatzacoalco. It is navigable for some distance, and also flows from the Chimalapa mountains; runs almost parallel with the Uspanapa, and falls into the Goatzacoalco 4 miles above Minatitlan.

The *Chalchijapa*, a stream taking its source in the Chimalapa mountains, joins the Goatzacoalco 14 miles below Suchil. No stream of any note enters higher up the Goatzacoalco, on the right bank.

The *Huasuntan* takes its rise in the Suntla range of mountains, and is afterwards joined by the Chacalapa, which rises in a small lake 3 miles south of Arayacan; the course is then north-east. Towards the Gulf it branches. The principal arm turns to the right, and falls into the Goatzacoalco, under the name of Rio de las Calzadas, 4 miles from the Gulf. The left branch connects with the Gulf through a small channel, called La Barilla.

The next tributary of the Goatzacoalco of any importance is *El Rio de Jattepu*. It rises in the mountains of Villa Atta, follows for the most part a course from west to east, and empties into the Goatzacoalco 3 miles below Suchil. The banks of the upper regions are inhabited by Mijes; and the river is navigable for boats as far as Tatha, or Algodonal, about 50 miles from the mouth.

About 24 miles from the mouth, on the right bank, there are two caves, of apparently considerable extent. One was perfectly dry when I passed; the other I entered with a canoe, but, for want of light, I could not explore it. On the same side, about 12 miles lower down, stands Hargusana. If the farò, which the Louisiana-Tehuantepec Company was playing for a certain time in this country could have been continued longer, Hargusana

would have become a large place. In the first place, it was selected to become the head of the river-navigation, instead of Suchil; and secondly, it was the point where the projected railroad from ocean to ocean was to cross the river. For a considerable distance to the right, the river-banks form densely-wooded highlands; and the left banks are low and flat, intersected by a few streams running from north-west to south-east. The current is generally stronger than in the Goatzacoalco, and the river full of snags, which, however, did not prevent the little steamer *Suchil* making several trips to Hargusana.

El Jumnapa, generally called *La Puerta*, is a river, rising in a mountainous district lying south from the Jaltepec river. It is navigable for boats during six months, to the point where the Company's waggon-road intersects the stream. A few miles below the Pass, the Portugero river enters by the left bank, and the river continues a course in an easterly direction; but it has so many sharp turns, that I should think it would be very troublesome and dangerous to navigate it by steamers. Seven miles above Suchil the river joins the Goatzacoalco. Over the Jumnapa River the said Louisiana-Tehuantepec Company built a bridge; but it was so badly constructed that the high water took it away before it was finished. The La Puerta Pass now forms the embarcadero, in the rainy season, for the products which are brought down from the Pacific side, to be forwarded to the Gulf coast, and *vice versâ*.

The *Serabia River* takes its rise in two forks on the northern slope of a mountain-range west from St. Domingo; runs first from west to north, and afterwards, taking an eastern direction, discharges itself into the Goatzacoalco, north of Malpaso. The *Serabia* has water enough to be navigable for canoes all the year round; but it has several rocky barriers in its bed, which impede navigation.

El Mongón River comes from the mountains of San Juan Guichicovi, and joins the Malatengo after a short course.

El Pachiné takes its source near Guichicovi, and falls into the Malatengo, 4 miles below the town.

El Malatengo is formed by the rivers of Petapa, Del Banco, and those creeks which descend from the Guicsila Mountain. Afterwards the Malatengo is joined by El Rio de Amaloya, El Rio de Tarifa, and numerous other creeks which drain the plateaux situated north from Cerro Prieto.

El Rio Verde is formed by the junction of El Banco del Marques (creek) and the Torrentera de Guihelona. It runs from north-west to south-east, and discharges itself into Laguna Superior, near the Salina de Juchitan, distant from the town about 12 miles.

El Rio de los Perros (Dog River), rising in the mountain of Sta. Maria de Guineyate, falls into Laguna Superior, about 9

miles below Juchitan. In the summer season the river near Istaltepec becomes almost entirely dry, but farther down the water appears again.

El Rio de Tehuantepec has its source on the southern slopes of the mountains of Villa Alta; its course is mostly from north-west to south-east. It waters Tecuisitlan, Jalapa, and Tehuantepec, and discharges itself into the Bay of La Ventosa. In April, May, &c., the time when the south wind prevails, the bar of the river is entirely obstructed by sand.

Some more streams of note are the *Chicapa* and the *Ostuta*, both situated on the east. The first rises in some parts of the Sierra de Chimalapa, to the east of San Miguel. The second has its source in the same mountains, but more to the east. After having augmented the volume of its water through the junction of various tributaries, it follows a direction from north to south-west, and empties itself into the most eastern lagoon.

The stream *Chicapa* passes near the town of San Miguel, La Venta, and a great many *ranchos*; and flows, after a course from north to south, into the Laguna Superior.

The rivers I have enumerated, and also many creeks, afford an abundance of water-power; but there is neither grist nor saw mill to be seen in the whole country. All the rivers on the Pacific side, having a strong current, are not well adapted for navigation; but the Goatzacoalco, with its eastern tributaries, and the Jaltepec, could be made capable of forming a safe water-communication.

There are three different climates on the Isthmus. In the plain of Tehuantepec and along the coast the rainy season sets in in June, and lasts until October. The temperature of this part is higher than that of the remainder, and the country is generally considered very salubrious; the air being pure and clear. The heat produces perspiration, and gives no feeling of oppression in breathing. The nights are cool. The mountain range—Cerro Prieto, &c., which approaches within 20 miles of the lagoons in the south-west—is the climatic boundary between the Pacific division and the central part. On those tablelands the rainy season lasts longer, and the heat is comparatively moderate; the nights are also cooler. Farther north, descending towards the level of the Atlantic, the heat begins again; everything is affected by dampness, and heavy dews lie around in the morning. The rain falls in greater or less abundance for 10 months in the year. The country is proportionally insalubrious; the nights pleasant; and heavy thunder-storms occur very often. The hottest season is in April and May; the coldest days in November and December. The most prevalent diseases—principally on the Atlantic side—are chills, intermittent fevers, biliary and gastric derangements, pleurisy, and other malarious diseases.

The Indians, who are by far the most numerous portion of the inhabitants of the Isthmus, are descendants of various once powerful tribes. They are not without intelligence. In many points they are much behind in civilisation; but, in matters which are within the sphere of their observation, they show more intelligence than is to be met with in uneducated people of other countries. They are fond of music; every village possessing a musical band, which, although very defective, answers for the purpose. They, when under compulsory circumstances, are capable of great activity, and of enduring much fatigue; but in their ordinary avocations they are tardy and irregular. Being of a pacific disposition, they would, doubtless, become both useful and industrious, if they could be blessed with a good government. Schools have not yet received the attention which their importance demands; in fact, there seems to be among many of the people a great indifference in regard to them. The inhabitants are well-shaped, and of a yellow or dark complexion. Pintos are only found in the Pacific division and in the central part. Cutaneous eruptions and leprous diseases are sometimes met with among the population. The common dress consists of a hat of some weight, white shirt, and loose cotton pants, called *calzonillos*. Instead of shoes, they wear sandals, or go barefooted. The women of the Japateco race evince some exterior charms in their national costume, which consists in plaiting the hair in two folds, and winding it around the head, often interspersed with flowers, in the old Grecian style. From the hind part of the head descends a white flowing dress, reaching to the shoulders, and called *guaypil*. Around the chest they throw a kind of vandyke, called *guaypitote*, which attractively reveals the often well-moulded arms and a rising bosom. Around the waist is wrapped a piece of home-made cotton-stuff, called *inagua*, fastened with a girdle, and reaching to the feet. They also go barefooted. Children in a state of nudity, among the male sex, are common. The women, like those in other countries, are fond of ornaments and jewels; they adorn themselves with beads, corals, and eardrops, of more or less value. Their bearing is stately and composed; but their manners in regard to morals are most blameable. They are lazy, not very clean in their habits, eating the insects from the bushy heads of their children and other kindred, knowing nothing about cookery or sewing, and ill-fitted to make good housewives. The apparel of the other tribes of the Isthmus differs little from that of the Japatecos. The wants of the natives are few, and easily supplied. Corn is the staff of life for the whole country, and the national dish is black beans. The regular fare is, for breakfast, a kind of dough, called *atole*, made of corn or rice, and some hot *tortillas*. At dinner they eat black beans, cooked in an

earthen pot, and *tortillas*. *Atole*, *tortillas*, a piece of tarago, dried beef, fried on the embers, make up the bill of fare for the evening. These *tortillas*, eaten instead of bread, are made from crushed corn, worked into a flat shape by women, and baked on an earthen pan, called *comale*. For their use in travelling they make cakes in the same shape, called *toyopozel*, to be eaten cold and dry. They are similar to those cakes which the Israelite population in Germany make at Easter feast, and which they call Mutzenkuchen. In taking their meals, the natives use neither spoons nor forks; and neither table nor chair is wanted. The whole business is done in the Turkish fashion. Coffee is rarely taken by the natives; those who can afford it, take chocolate. The liquor for the labouring population is crushed maize, imbibed in cold water; the juice furnishing a beverage agreeable to the taste, and quite refreshing.

The country which comprises the Isthmus of Tehuantepec contains an average population of 62,000 souls, living mostly in compact villages, of which I here give some account.

VILLAGES.

Huilotepc is a pretty village at the foot of a hill on the left bank of the river, about 9 miles from Tehuantepec and 5 miles from La Ventosa. It contains 250 inhabitants, who cultivate corn and subsist mostly on the product of fishing in the adjacent lagoons.

Tehuantepec, the capital of the department, is beautifully situated on both sides of a river; the part on the northern bank being by far the most important. The town is divided into 16 barrios (districts), and every barrio has its chapel, more or less large. The only building of note is the cathedral, built in the year 1530 by the last Cacique, Cocipopi. Under the same roof with the church is the convent of the Franciscans, now occupied by a garrison of soldiers, and a smaller building is inhabited by the priest. With the exception of these buildings and a few more scattered over the town, the houses are made of adobe, with flat roofs, and one storey in height; the interior being laid out with brick pavements, and sometimes furnished with mats. The buildings of the lower class are thatched with palm-leaves, and form but one piece, without window or chimney. In the midst of the town is the plaza, with a covered market, where every product of the country can be found for sale, and where the national manners are shown. The town is the seat of the *jefe politico* (governor), and of a judge of the first instance, and is governed by an *ayuntamiento* (city council), composed of three *alcaldes* assisted by sixteen *regidores* or aldermen. There are also two different branches of custom-house administration. The one, charged with the internal taxation, is called *Aduana Terrestre*; and the other, collecting the duties levied on goods imported or exported by sea, is styled *Aduana Maritima*. The town possesses several stores, mostly kept by half-caste Spaniards, three billiard-saloons, and one hotel—kept by a Frenchman. The inhabitants number about 14,000 souls, of which the greatest part are remnants of Zapatecos—once a powerful tribe of Indians—who have preserved their own idiom. Their industry consists in the manufacture of leather, buckskins, saddles, shoes, cotton-cloth, silken sashes, hats, silver-ware, and pottery. A great portion of the environs can be irrigated, and is consequently cultivated with corn, some vegetables, and a great variety of fruit-trees. Some tracts of land yield two crops of corn per year.

Mestiguila is a small village, situated north-west from Tehuantepec on the

road to Basaca, distant 3 miles; the inhabitants, numbering 260 head, cultivate corn, fruits, and esculents, and raise cattle.

Flacotepec is a very small village pleasantly situated at the foot of the Cerros de los Amates, 12 miles north from Tehuantepec; a beautiful stream runs through the settlement, which contains 150 inhabitants, who cultivate corn, indigo, beans, &c., having the advantage of irrigation on the greatest part of their land.

La Crimega, a stock-rancho most beautifully situated, and surrounded by water-power, lies half-way from Chihuitan.

Comitanillo, situated eastward from Flacotepec, contains about 250 inhabitants, who cultivate corn, indigo, sugar-cane, &c. The position of the village being very low, the environs are subject to inundation. In consequence of this the place is very sickly, and the number of the population is decreasing.

Santa Maria Guinegate lies on the headwaters of the Dog River; it contains 280 inhabitants, who cultivate only what they require for their own support.

Laollaga is an insignificant village situated on the creek of the same name, with 130 inhabitants, who cultivate corn, indigo, and sugar-cane.

Chihuitan is a little town with a beautiful church and some nice buildings. Here is annually held, on the fourth Friday in Lent, a considerable fair, where opportunity is given to buy anything that the country produces. A channel of the beautiful Laollaga runs through the village, which is surrounded by fertile patches of land. The inhabitants, numbering 650 souls, cultivate corn, indigo, esculents, and some fruits.

Santa Cruz is a sugar-plantation near the Dog River, $2\frac{1}{2}$ miles from Chihuitan. The machinery is driven by water-power, but everything is old-fashioned. The sugar-field, of which the area may be calculated at 256 acres, requires to be replanted. Last year it did not yield more than 600 arrobas of sugar. 1 arroba equals 25 lbs.

San Geronimo, situated on the right bank of the Dog River, has a fine church, and some other substantial buildings. The inhabitants, in number 600 souls, are industrious, and cultivate corn, indigo, esculents, &c.

Mattepec, a neat town situated 5 miles farther down the river, possesses a beautiful church, plaza with covered market-place, and two stores. The inhabitants are industrious and laborious; they cultivate corn, indigo, and esculents, and possess also some stock. Here the road leads across the river.

Espinal is a pretty village containing 400 inhabitants, who cultivate corn, indigo, &c. It is distant from Istaltepec half a mile.

Juchitan, the second town on the southern division of the isthmus, is situated on the left bank of the Dog River, 4 miles from Espinal, and 18 miles from Tehuantepec. It possesses three stores, but very few substantial buildings. The inhabitants, in number nearly 6000, are industrious and laborious; at the same time they are a warlike people, and meddle in all political struggles, which occur constantly in this unhappy country. About 8 miles from the town, near the point where the Estero de Estaca falls into Laguna Superior, is situated a Salina belonging to the said town, where salt is obtained in the same way as in Santa Cruz, viz., by solar evaporation.

The settlements on the peninsulas formed by the lagoons along the Pacific coast are:—

San Mateo, standing on the most southern peninsula, is the residence of a priest, and contains 1000 inhabitants, who cultivate a little corn, and raise horses, mules, donkeys, and sheep.

Santa Maria del Mar lies more towards the east, near the Boca Carra. Its inhabitants, numbering about 800 souls, pursue almost the same occupation as the population of San Mateo.

San Dionisio is situated more north, on a small strip of land, separated by

the Canal Santa Teresa from the continent. The inhabitants cultivate very little, and support themselves chiefly by fishing.

San Francisco Istaltepec is the last village, inhabited by the descendants of a tribe called Huaves. The only means of subsistence of this miserably poor people is by fishing. There is no sign of cultivation to be seen around the settlement, which lies almost on the most eastern extremity of the lagoons.

A large tract of land, partly situated in the central part of the isthmus, was given by the Spanish Crown to Ferdinand Cortez as a fief. This estate is known under the name of *El Marquisano*. The limits have never been clearly defined. The present owners, a party from Oaxaca, claim an area of 44 leagues. According to their statement, the boundary lines of their claim would commence at a point near the head-waters of the Rio Verde, running in an easterly direction to the Rio de Lazadero, then running north for a short distance, following a line north-west to the *Majada Range*; hence running south along the Cerro de Guaycamayo through the *Portillo de la Chivela* to Rio Verde, comprising the whole range of Cerro Prieto and its eastern prolongation, the *ranchos de la Matadel, Agua Caliente, de la Venta, de San Pablo, de Llano Grande, Chicapa Arriba, de Agua Escondido, St. Yago, Tarifa, Chivela, Amoloya, &c.*, with a population of about 400 souls, whose principal occupation is to attend to the numerous cattle which the owners keep in the last-named *ranchos*. A great number of smaller stock-ranchos are located on the *Marquisano*, belonging to other people, who pay a nominal rent to the owners and raise their stock separately. Very little land adapted to agriculture is found within the boundaries of the said estate. North-east from the hacienda de Tarifa, at a distance of about 18 miles, lies

San Miguel de Chimalapa, on the right bank of the Chicapa, near the junction with the creeks *Xoxocata*, coming from north, and *Monetza*, flowing from a westerly direction. The village is surrounded on all sides by mountains, and contains about 460 inhabitants, who are given to the culture of corn, beans, peta, and rice, and fabricate hammocks, *layos*, &c. Hence a bridle-road leads over the dividing ridge to a little place called *La Cofradia*, 8 miles distant. The huts of this settlement are embowered in the woods.

Santa Maria de Chimalapa is distant from the latter place 22 miles by a very bad road, and is situated on the right bank of the Milagro River. The distance from the town to the Goatzacoalco River is 3½ miles. The place is peopled by the remnants of a tribe called the Zoques. Although good-hearted, they are deplorably ignorant. They cultivate corn, hardly sufficient for support, tobacco, rice, beans, and pumpkins. The oranges of this place and those of the Rogradia and San Miguel are renowned as the best on the isthmus. Near the Arroyo de Otates, on the road from Tarifa to Santa Maria, stands a new settlement, composed of a few shanties, inhabited by Zoques, which is called *Tierra Blanca*. The inhabitants of this and of another new settlement along the Tarifa River are given to stock-raising. North-west from the last point lies

El Barrio (de la Solidaridad), built on an elevated ridge of slate, in a healthy position, alongside a stream; it has about 1200 inhabitants, who are tall, strapping fellows of a dark complexion, called *Zambos* (mulattos), a half-caste between the Indian and the Negro. They understand no other language than Spanish; and cultivate corn, a little indigo, and raise stock.

Santa Maria de Petapa has a beautiful church with an organ, is the residence of the priest, and was formerly a place of some importance; but since the year when the cholera and other diseases made havoc among the natives, the town has daily decreased. It has yet about 1100 inhabitants, who cultivate corn, rice, beans, indigo, cabbages, and some fruits. The place has two stores, and is the seat also of the internal custom-house.

San Domingo is a village 1½ mile north-west from thence, which was,

some years back, one of the richest settlements of the isthmus. The population was formerly principally given to the cultivation of the nopal-plant, to the rearing of the cochineal insect, and to the cultivation of indigo; but since these dyes have been superseded by chemical equivalents, and consequently their value so much reduced, the Indians were induced to abandon entirely the nopaleros, and to cultivate indigo. The consequence was a universal poverty, from the effects of which the inhabitants have not yet recovered, and there is little probability of their recovering in many years. The situation of the place, on a plateau backed by high mountains, having at its base a stream of the finest water, is extremely healthy. The houses—many of them made of adobe, with flat roofs—are in a dilapidated state. In the environs grow a great many fruit-trees, from the produce of which the population, in number 800, maintains itself during some months.

Guichicovi (*San Juan de*) stands on the top of a mountain-ridge, 18 miles north of Petapa, in a very healthy position, surrounded by other lofty mountains. The buildings are mere huts; the church, a stone structure, commenced in an ambitious style, a long time ago, has to this day not been finished. According to a vulgar tradition, some obscurity hangs over its foundation. The inhabitants, to the number of more than 6000, are descendants of the Mijes tribe; they profess and practise the Catholic religion, yet some preserve many of their native rites and superstitions. They retain their original language, and constitute a sober and laborious population; they devote themselves to agriculture, and provide the greatest part of the isthmus with panella, corn, rice, beans, and plantains. Their fields are scattered all over the country, sometimes at a distance of 20 miles and upwards. The pride of a Mije is to possess as many mules as possible, and all the money he is able to make he carefully accumulates for increasing the number of his favourite animals—no matter if he has any use for them or not. On the Atlantic division, the principal town is

Acayucan (*San Martin*); a nice town, situated about 50 miles from Suchil, in a northern direction, and only accessible from thence in dry seasons. The place is garrisoned by detachments of soldiers, and is, besides, the seat of the *jefe politico* and of the judge of the first instance. Some inland trade is carried on by the pass of San Juan, on the margin of the river of the same name 20 miles distant. The number of the inhabitants is just 6000, and they cultivate corn, sugar-cane, tobacco, beans, vegetables, and fruits. In the environs, which are well cultivated, there are some coffee-plantations.

Plata is a little village south-east from Acayucan, with 360 inhabitants.

Socomusco lies 3 miles from Acayucan, on the road to Minatitlan, with 1200 inhabitants, who cultivate cotton, &c.

Tesitepec is situated 6 or 7 miles south-east from Acayucan, and as many miles from the Brazo Mistan. It contains about 2404 inhabitants, all Indians.

Jatipan is pleasantly situated; its streets and plaza form a greensward. Close to the town is an artificial peak, erected in honour of Doña Malincha, mistress of Hernan Cortez, whose birthplace was somewhere near here. From the summit of the mound one has a fine view over the adjacent country.

Chimamua, 5 miles north from Jatipan, is a handsomer place than the last-named village; and there are a good many brick buildings, built in a beautiful style, here. The town possesses several stores, and a fund kept by a Mexican lady. The place is a favourite resort of the gentry of Minatitlan, distant about 10 miles. The inhabitants number 1600 souls, and cultivate almost everything which is cultivated in the neighbourhood.

Otiapa is a neat village $1\frac{1}{2}$ mile from Chimamua, with 850 inhabitants—

Indians—who fabricate earthenware, and are partly employed in the monterias as axemen.

Coguliacaque is a large Indian village, 7 miles from Minatitlan, built on a plateau, and contains about 2400 inhabitants, who plant sugar-cane, corn, plantains, &c. Some of them are working in the monterias, while others are employed as boatmen on the river.

Minatitlan, or, as it is called by the natives, *La Fabrica*, is a little town situated on the left bank of the Goatzacoalco, 20 miles from its mouth. Being the head of ship-navigation and the outlet on the north for all productions shipped from the isthmus, it is consequently of some importance. Several extensive mercantile houses are in operation, among which I cite that of Daniel Price, Esq. Half the buildings are built of timber brought from the States: there are very few houses of brick or adobe; those of the natives being mostly put up in the fashion of the country, and covered with palm-leaves. The town is generally garrisoned by a small detachment of soldiers: it is the seat of a jefe politico. There are also a custom-house and a post-office in the place. From September to January there are sometimes eight or ten vessels lying on the levée to wait for loads of mahogany-wood, but at other times there are seldom more than one or two. The average depth of the river close to the landing is 11 feet. Notwithstanding that the town is situated on an elevated ridge running from the river to the back of the village, it is pronounced insalubrious, being on two sides surrounded by swamps.

At the mouth of the Goatzacoalco there is a little fort, surrounded by a few huts, which I understand is at present dismantled. Among the haciendas and other minor settlements in the Atlantic division of the isthmus, on the west bank of the Goatzacoalco, are the ranchos de Tierra Nueva, Buena Vista, Frangipan, Flocoeno, Almagro, &c.

On the eastern banks of the Goatzacoalco are—

Ishuatlan, an Indian village, distant 4 miles from Paso Nuevo, the ferry-place on the Goatzacoalco, and within 7 miles of the sea-coast. The place contains about 760 inhabitants, who cultivate corn, sugar-cane, cotton, fruits, &c.

Molacan is another Indian town, a little more considerable, situated on the top of a ridge that overlooks a beautiful country. The inhabitants, numbering 1000 souls, devote themselves to the cultivation of the same products as the foregoing population.

I never went farther east, and consequently can say nothing positive about the population and the country. Higher up the Goatzacoalco river, on an elevated hill, on the right bank of the Brazo Apontyo, about 8 miles above the junction of the Brazo Mistan, 20 miles above Minatitlan, is

Hidalgotitlan, but more frequently known as *Los Almagros*. It contains about 400 inhabitants, who possess some cattle, and cultivate corn, tobacco, rice, sugar-cane, and some fruits. There are only two coffee-plantations and one of cocoa here.

Guapinoloya is a settlement of Indians on both sides of the Goatzacoalco, about 3 miles above the *horqueta*. The inhabitants are poor, mostly employed in monterias or as boatmen. Another settlement, called *Pinas Blancas*, situated a short distance above, is of so little interest that one may be pardoned for passing it over in silence.

In regard to agriculture there are two peculiarities, which are at the same time drawbacks to the development of this branch of industry, viz., that the prairie land does not produce any crop, and that no produce keeps longer than a couple of months. Locusts, blackbirds, and inundations prove sometimes very serious to different crops. The implements used are a wooden plough of very primitive construction and a *machee*. On the Pacific division, Mexican labour in the field is paid with 18 or 25 reals per diem, and on the Atlantic,

working hands are dearer. In the monterias a hand gets 3 bits a day and found. The late Louisiana-Tehuantepec Company paid the same wages.

PRODUCTIONS.

The chief products of this country are :—

Corn, cultivated in all sections. The mode of culture in the plain of Tehuantepec is similar to that in other countries; they generally raise two crops, one in the dry season through the medium of irrigating, and another in the rainy season. In the central part, where the corn-fields are often on steep and rocky hills, after having cut the brush and burnt it down, the seed is put into small holes a few inches deep, made with a stick and covered with the hand or with the foot; no other preparation of the soil is required. As soon as young grass and weeds begin to appear, they are removed with the *machete*. The land around Petapa produces but one profitable crop every 8 or 10 years; the time of sowing is in May, and the harvest in September and October. Farther north and east the soil is so rich that the same spot can be cultivated every year with lucrative results. The inhabitants from Petapa, El Barrio, and S. Domingo occupy patches of land in those regions, where they regularly every year make a crop of corn; time of planting is in December, and time of harvesting April and May. The Indians living on the Atlantic division sow and harvest in every season.

Black beans, cultivated all over the country, put in the ground like corn: time of planting, May, June, July; time of ripening, three months.

Rice, planted in the central and northern parts, sowed the same way as corn; time of putting it into the ground April; the crop is ripe in October. Shelling is done by pounding the rice in a wooden mortar.

Indigo, cultivated on the Pacific coast and around Petapa. The seed is sown in the month of May, and the plant cut in September. The method of extracting the dye is by putting the branches into a large vat, containing cold water, leaving them for a sufficient time, say twenty-four hours, and stirring from time to time. The upper water is then lowered and the lower pressed in smaller pots, until the solid part is deposited; the residuum is then put into little bags, to get entirely free from water, and afterwards exposed to the sun for drying.

Sugar-cane, cultivated all over the country in the usual method of the West Indies. The cane is generally fit for cutting in the winter months. The product obtained is very coarse and black, and chiefly employed to be mixed with cacao. For the use of the population they fabricate a yellow stuff, called *panella*; which is nothing else than cane-juice, boiled and dried by smoke without being clarified.

Pita, obtained from the plant called *falle* (*Bromelia*), which is raised near S. Miguel de Chimalapa, and on the Atlantic coast. The pita is used instead of hemp-thread by saddlers and shoemakers.

Tobacco is raised at Santa Maria de Chimalapa, and in almost every village on the Atlantic coast. The best kind comes from Huimangillo, a town situated on the road from Minatitlan to Tabasco.

The vegetables raised on the Pacific side are pumpkins, garbanzos, green peas, tomatos, camote, sweet potatoes, garlic, and onions of a very diminutive size. On the Atlantic division they cultivate several kinds of lettuce, cabbage, and peas. As vegetable diet the buds of the prickly pear, *verdulata*, and *yerba santa* are also used. Experimental crops with cacao have been made on the lower Goatzacoalco, but with no promising results. Coffee yields satisfactorily, but for want of a market there is little encouragement to plant any. Cotton is cultivated on the Pacific coast, between La Ventosa and Acapulco,

also on the Upper Jaltepec and in the settlements along the Gulf coast. Cochineal planting has been entirely abandoned, as well as obtaining gum from the tree *siphonia elastica*. North of Acagucan they still gather some vanilla. Fencing is troublesome work, as no timber lasts longer than one or two years. Hedging is preferable, where it can be done with maclura plant, maguey willow, or with the cirneta-tree.

The fruits of the country are:—

Ananas (pineapples), cultivated in all parts, chiefly on the Atlantic coast, ripe in July.

Aguate, on the Pacific coast and on the central part; ripe, July.

Anona, custard apple, several species in all parts.

Capulin, a kind of cherry, very sweet; ripe, April to September.

Cirneta, a kind of plum, of a sourish taste; ripe, May.

Chaiotte, the fruit of a vine, growing in the central part.

Cocos, on the Atlantic and Pacific.

Citrons (*Citrus limita*), all over the country.

Banana, in every part; ripe in every season.

Cordnan, a fruit of the shape of a pine apple; ripe, October.

Corozo, on the Atlantic division; ripe, April to July.

Cocoyol in the central part. The kernels of the fruit furnish an excellent oil. From the juice of the tree an agreeable drink is obtained.

Guayaba, two species; one growing on a middle-sized tree, and the other on a small shrub.

Grapes, little black berries, in the central part.

Granados, on the Pacific coast.

Lemons, in every part; ripe in all seasons.

Mancos, chiefly on the Atlantic; ripen in July.

Nanche, a little fruit of the size of a cherry; ripe in July.

Oranges, all over the country; ripe from September to January. In Chimalapa they are ripe from September to the month of April.

Papayo, the fruit of the papaco-tree, ripe in April and May.

Pitayo, the fruit of a cactus, Pacific coast; ripe in May and June.

Plantains, all over the country.

Melons, water and musk melons, chiefly on the Atlantic division; ripe in April and May.

Tamarinde, on the Pacific division; ripe in February to May.

Chico zapote, on the Pacific; ripe in every season.

Zapote negro, ripe in July.

Zapote colorado, also called *mansey*, grows in great quantity in the forests of the Goatzacoalco.

A good many of these fruits possess a great quantity of seed in comparison with the pulp.

As the Isthmus presents a country divided into regions, each different from the other in topography and temperature, it may easily be understood that the character of its vegetation must be varied. A great variety of cactus grow on the Pacific coast, while hardly any are found farther northward. Cocoa and other fruit-trees do well around Tehuantepec, but none of these can be found in the mountainous district of the centre. Brazil and sandal wood can only be found on the Pacific. Wild silk grows near the hacienda of Tarifa. Many valuable and ornamental timber-trees are only seen on the Atlantic declivity, viz., Brazil, cascalote, fresno, fonote, mahogany, mangle, macayo, &c. Some timber is common to both divisions, as acacia, amate, encina, guayaba, palo moro, mulato, wild orange, cedar, ceiba, rosewood, achate, ule, figaro, guanacaste, &c.

Several species of pitch-pine (*ocate*), rich in turpentine, grow in the elevated section of the central part.

A variety of dyewoods are met all over the country, viz., achote, guisache, ebano-verde, &c. Medicinal plants are found dispersed over various localities. Thousands of creeping plants, decked with blossoms of delicious fragrance, bend from every tree. There is a great number of plants, curious and well worth the attention of the botanist. The vegetation is really exuberant in the northern division, and this is the only part where emigrants should be directed to settle, if any are ever induced to try their fortunes in this country by farming. It would take, any how, men of no little perseverance, courage, and means to brave the diseases and physical difficulties which the natural condition of the country presents. It is a well established fact that white people are not fit to do much outside work in this country. After the rainy season sets in, there reigns an epidemic among the natives working in the monterias, which chiefly attacks those who come from the Pacific division.

The domestic animals are horses, mules, cattle, sheep, pigs, goats, chickens, dogs, cats, &c. No attention is paid to the breeding of animals. The horses are used as saddle-beasts and sometimes for draught, in which case the load is attached to the saddle-bow or to the animal's tail. Single cattle are often conducted in the latter way: I several times saw fierce-looking steers walking quietly behind a *raguero* on horseback, tied to the horse's tail. The wild animals are the tiger, or ounce, yellow with black streaks: he is of a somewhat ferocious character, although he seldom attacks men. I met several in different localities by day and by night, but was never troubled by them. The tiger is hunted with dogs; and, being occasionally made to stand at bay, the hunter has sufficient time for a good, deliberate shot.

The jaguar is almost of the same size as the ounce: instead of streaks, his skin is marked with black spots.

The lion or puma is of a pale yellow colour, without mane: he has the same shape as the Californian lion, but inferior in size.

The lioncillo is a diminutive species of the same animal, entirely of black colour.

The tigrillo, or ocelot, is a small sized tiger: the skin is white with black spots.

The tapir, by the natives called *la danta*, is of the size of a donkey, of deep brown colour. While I was in the country I only saw two specimens, male and female, last spring near the Jaltepec. We fired from a short distance with several guns, loaded with shot, at them; but all this took so little effect on their skins, that they went off like lightning.

The fox, called by the natives *gato monte*.

The racoon, called also *el tejón*.

The weasel or the *faguache*.

The ant-eater, and the armadillo (the latter curious because his body is covered with a shell), the iguana, the deer, hares, rabbits, two species of wild hogs: the one of the size of a pig of a few months, with a gland on his back, from which a fetid secretion is exuded; the other of the size of a little pig 1 to 2 months old, short eared and short tailed, of black colour, and called *el senzo*. Various species of monkeys, among them the howling monkey, whose cries often resound in the woods like the roar of some monstrous beast. Black and gray squirrels, the opossum, cats, and vampires. The latter infest some localities, where men and animals are subject to its attacks.

Birds of various descriptions, of which some are remarkable for the gaudiness of their colours, as the eagle, the crow, the guaycamaca, several species of parrots, the toucan with large bill, the oriole with his hanging nest, the lark, the paco, the magpie, the woodpecker, the redbird, the mocking-bird, the swallow, the king-vulture, and several other varieties, the colubri, pigeons, and turtledoves, wagtail, &c. The pheasant abounds in the forests of the Goatzacoalco. The pava, a kind of wild turkey, the chachalaca, besides a

great variety of partridges, quails, &c. The aquatic birds are—the flamingo, ducks, cranes, pelicans, herons, &c. Of reptiles there are a great many found—alligators, snakes, iguanas, lizards, turtle, tortoise, &c. Fish of various classes are found in all the rivers and creeks. The Indians secure them by placing creels, or by using the *taruya*. A very blameable manner of catching fish is also to throw a species of vine (*sapindus*) into the water, by which means the fish gets stupefied, and in consequence is readily taken. It often happens that the stupefaction is so strong that the fish does not recover from it. Bees are always found in the natural cavities of the trees. All over the country are found ants in immense numbers, spiders, frogs, toads, snails, tarantulas, centipedes, alacran, scorpions, &c. Very annoying insects infest some regions. Hornets make their nests in form like that of our own wasp, and hang them on the branches of trees. *Prododores*, a little gnat, quite poisonous, met with in heavy swarms in the portion from the Malatengo to Minatitlan. *Sancudos* or mosquitos swarm all night. The gigger (*nijna*), a fly getting into the feet and limbs: if not extracted as soon as possible, he will cause fearful pain and bad consequences. The *moyaquil* is a species of worm, which grows from the egg of an insect, in the flesh. The best way to get rid of him is to plaster the spot where he entered with turpentine or tobacco-juice. *Garrapatta*, a large and the *pinobilla* a small tick, infest the woods on the Pacific division in the dry season. The *talaja* and other bed-bugs incommode the sleeper at night. Almost every night thousands of shining beetles swarm in the air, among which one species, called *lucullo*, is the most remarkable.

ANTIQUITIES, NATURAL CURIOSITIES, HOT SPRINGS, &c., OF THE ISTHMUS.

In the vicinity of Tehuantepec, 5 miles higher up the river, on the other side, is the mount *Guengola*, with the extensive ruins of an old city and fortification. I, for my own part, never had occasion to explore the place; and as no other explorations of it have been made, little or nothing definite can be said about it. There are some caves of little interest, diagonally opposite from Tehuantepec. Near San Domingo are caves, which claim more attention from the public. The entrance to the largest is on the west side of a very steep mountain, called *Guixila*, some hundred feet above the level of the plain. The first part of the cave forms a large hall, overhung with stalactites, and possesses a spring of the purest water, which sinks through the bottom, and makes its exit at the base of the mountain, in the midst of a grove of orange-trees. From the main hall, the caves extend into the mountains to a distance of about 2000 feet, forming alternately corridors or small halls. That the place has been formerly inhabited, or at least resorted to for safety in time of danger, is proved by the broken earthen jars found in the principal piece. Now the only inhabitants are bats.

On the western and southern slopes of Cerro Prieto there are hot springs, which are resorted to in April and May for health by invalids. There is another curiosity, about 10 miles south-west from Suchil, consisting of a natural bridge or tunnel. There, a little creek, called *El Arroyo de la Cueva*, forces its way through the massive rock for a distance of more than 105 feet. The tunnel extends from south to north, and the opening where the stream enters is 14 feet in width and 10 or 11 feet high. About the middle the water forms a little fall: hence to the outlet the tunnel measures not more than 6 feet wide and 6 or 7 feet in height. The top of the tunnel forms an elevation about 40 feet high, covered with lofty trees.

No great opportunities are offered here for embarking in mercantile business.

Exceedingly high duties, amounting to prohibition on goods imported from abroad, internal custom-houses, and internal taxation, called *alcabala*, no commercial highway, and numberless other restrictions—all these are drawbacks to honest trade. To this country are imported cotton duck (*manta*); cotton thread, coloured cotton handkerchiefs, calicos (*sarraza*), muslins, light silken stuff, merinos, alpaca, and many other light stuffs. Flour from the States, claret, cognac, and other liquors. Malaga raisins, wax, crockery, hardwares, &c.

Among the export hides constitute a large item. Indigo is nearly all used in the dyers' shops of Oaxaca and of the interior; the cotton, planted on the Gulf coast, is sent by way of Vera Cruz to the northern part of Mexico. The most important article exported from the Isthmus is mahogany, all the other exportations not being worth mentioning. The trade in the interior, with the products of the neighbouring countries, is a little more important, notwithstanding that business is now mighty dull in consequence of adverse political circumstances. The products of the little industry in Tehuantepec, as saddles and shoes, are sold at Tuxtla Grande or on the Atlantic coast. Some sugar goes sometimes from Tehuantepec, by way of Ventosa, to Mazatlan on the Pacific. Shrimps and salt-fish go also from the Lagoons to Oaxaca. From the central part of the Isthmus, jerked beef and cheese are brought to the Atlantic coast. Rice, tobacco, and sugar are brought from Tuxtla to Tehuantepec and to Oaxaca. The salt, obtained in the Salinas near Tehuantepec and Inchitan, partly goes as far as Oaxaca and partly to the country inhabited by the *Mujes*. The coffee, consumed on the southern division of the Isthmus, is raised near Comactepec, a country in the direction of Villa Alta. The cacao comes either from Sonusco, called also La Pavinira, a country lying along the Pacific on the lower road to Guatemala, or from Tabasco. The country on the northern division of the Isthmus produces sarsaparilla in profusion, but none is exported. The lazos and the hammacs, made in San Miguel, are sold in Inchitan and Tehuantepec. A great many cigars consumed in Tehuantepec are fabricated in Jaltipan, Chimalameca, &c., on the Atlantic division.

In the plain of Tehuantepec, goods are carried in native oxen-carts; in all other parts on mules and horses. The freight, from Suchil to El Barrio, a distance of 60 miles, is from 2½ to 3 dollars per cwt. On other routes it is cheaper. The price of all things sold in this country is so fluctuating that it would be impossible to give it with any accuracy. I quote the following retail prices:—Coffee, 25 cents; cacao, 62½ cents; sugar, 18½ cents; rice, 6½ cents; beans, 6½ cents; salt, 6½ cents; meat, 6½ cents; flour, 25 to 30 dollars per barrel; corn is sold by the *arroba* of 25 lbs., 75 to 100 cents, &c. I am not prepared to furnish any statement respecting the geology, mineralogy, &c., of this country. Iron and other ores have been found in different localities, and there is no doubt gold is diffused throughout the mountain region, but is not yet found in sufficient quantity to induce people to work it.

A party of six persons, among them one or two Californian miners, is at present in the mountains of Chimalapo on a prospecting tour, and everybody is anxious to hear the result of the exploration. There is very little accommodation for the travelling community in this country. A road, called *camino real*, leads from Tehuantepec to Oaxaca; it is but a trail for mules of the roughest kind. The distance is 70 leagues, passing through Jalapa, Tegistlan, Las Vacas, San Bartola, San Carlos, Todolapa, San Dionisio, and Claquatula. Another *camino real* goes eastward from Tehuantepec to Guatemala: it passes through Istaltepec, La Venta, Nillepec, Janetepec, Tapana, Lapunta, Tonola, Las Marias, Pichicapa, Carreta, Mastepec, Esquinta, Carretan, Pueblo Nuevo, Tapachula, Tuxtla, Elchico, San Antonio, San Sebastian, Mogotenango, Guizotenango, La Irmanda, Don Garca, Esquino Grande,

Guatemala; whole distance 152 leagues. Another route leads over the mountains through Chiapas, but it is pronounced longer and rougher: the most important towns on it are Tuxtla Grande, 74 leagues from Tehuantepec, San Christoval, Camitan, and Gueztaltinango. From Minatitlan there is a road to Tabasco, whole length 67 leagues, crossing the Goatzacalco at Paso Nuevo, hence through Ishnatlan, Moloacan, San José, Huimargillo to Tabasco. The mail road from Minatitlan to Vera Cruz leads through Acayacan, San Andres de Tuxtla, and Alvarado; whole length 58 leagues.

Miles.

The road of the ill-fated Louisiana-Tehuantepec Company, starting from La Ventosa, passed Zuleta, a considerable hacienda, distant..	3
Hence to Tehuantepec, always level road	10½
Hence to Comitancillo	13
Hence to San Geronimo	8
From San Geronimo to Rockspring Station	11
From Rock Spring to La Urivela, over the river Verde, the way winding around the western side of the Cerro Prieto; splendid scenery and highly interesting tropical vegetation	7
From La Urivela, the head-quarters of the Company, to Amatoya, almost level, the surface mostly covered with palm-groves	6
From Amatoya to the next station, Xochapa, through the Pass of Niza Longa, hilly and llanos, covered with pastures	10
From Xochapa to Malatengo river, mountainous and timbered	6
From Malatengo to Pachiné river, pastures	1
From Pachiné to Mongón, hilly, pasturage, and timbered	2
From Mongón to Serabia river tableland, with occasional patches covered with timber	6
From the river to the station house	½
Hence to Jamnapa river, tableland intersected by three creeks; the greater part covered with grass, the last 3 miles hilly and covered with dense forests	11½
From Jamnapa to Portugero river is low bottom land, partly covered with hoja blanca and plantain-trees; distance	1
From Portugero to Suchil the surface is covered with a thickly wooded forest; for the first 6 miles level road, afterwards very hilly. Some points command beautiful views, east and west; distance	21
From La Ventosa to Suchil	117
From Suchil to Minatitlan by the river	100
From Minatitlan to the mouth of the river	20
Total distance from ocean to ocean	237½

M. G. HERMESDORF.

APPENDIX.

XXIX.—*Semipalatinsk*. By N. ABRAMOF, Member of the Imperial Russian Geographical Society of St. Petersburg.

[Translated from the Journal of the Russian Geographical Society for 1861, by JOHN MICKELL, Esq.]

Trade.—Semipalatinsk has long been celebrated for its commercial relations with the tribes of Central Asia. These relations existed in 1718, and in 1754 a frontier custom-house was established there.

The Russian and Tartar merchants of Semipalatinsk sell in the bazaars tea, sugar, other groceries, cotton stuffs, Chinese silks, porcelain, furs, wax, and honey. Although two fairs, from 25th May to 10th June, and 15th December to 1st January, were established in 1855, they are not frequented by merchants. The principal trade is carried on in the town during winter, when the Cossacks and peasants come in from the neighbouring stations and villages. As soon as the Irtysh is covered with ice, Kirghizes from the Ayaguz, and especially from the Kargaulinsk Steppe districts, bring to Semipalatinsk, on their camels, sheep and lamb skins, hides, camel-hair, ropes, and other commodities, which they dispose of to purchase grain, flour, tobacco, iron ware, and wooden boxes in return. During this season more than 1000 camels arrive at Semipalatinsk, and return with about 15,000 puds weight of corn.

The foreign trade of Semipalatinsk is carried on by Tartars and Tashkendians with the Kirghiz Steppe, Tashkend, Western Turkistan, Chuguchak, and Kuldja.

The articles exported to these places are black and red leather, manufactured in Semipalatinsk; cottons, woollens of brilliant colours, velvets, gold-lace, tinsel, watches, looking-glasses; iron, cast and wrought, manufactured and otherwise; and copper in sheets and pigs. Thin felts, sheepskins, and cattle, are brought in exchange from the Kirghiz Steppe. Cotton blankets and stuffs, silk "*Khalats*" (long robes), woollen carpets, fruit, and cotton, raw and in twist, are purchased at Tashkend; while from Kuldja and Chuguchak, tea, porcelain, silver in bars, silks, furs, looking-glasses, combs, &c. These articles are partly disposed of at Semipalatinsk, but the greatest quantity of them is sent to the Tumen and Irbit fairs, to Kazan and Moscow.

Since the cessation of the Russian trade in 1856, between Chuguchak and Kuldja, in consequence of the destruction of the Russian factory by fire, the export trade of Semipalatinsk has considerably decreased. In 1856 the value of goods despatched beyond the Irtysh amounted to 75,000*R.*, and the imports to 67,000*R.*

Chuguchak and *Kuldja* are situated at the western extremity of the Chinese empire, on the borders of the Kirghiz Steppe, which is subject to Russia. Chuguchak is distant 153½ miles from the town of Ayaguz,* and Kuldja 133½ miles from Kopal. Commercial relations between the neighbouring Siberian population and Western China have been already carried on for a long time. The Tashkendians, many of whom reside permanently at Semi-

* The Russian settlement on the River Urdjar is 87 miles from Ayaguz, while the distance from Urdjar to Chuguchak is 67 miles.

palatinsk, and Tartars constantly visited Chuguchak for trade; but all entrance was prohibited to Russians, who traded under the disguise of *Tasikendians* and other Asiatics. Between the years 1808-19, Lieutenant-General Glasenap, the commander of the Siberian division of the army, contributed much towards the extension of external trade. He organised ten regiments of the line, and nine batteries of field artillery, which were employed in subduing the *Kirghiz* marauders: these were at last reduced so completely to subjection that Russian caravans and even single individuals could proceed safely through the country without fear of encountering those robbers who had formerly limited and almost destroyed the commercial enterprise of Russian merchants.

It was during the administration of Glasenap, that Russian caravans first proceeded to Kokan and to the Chinese frontier towns of Chuguchak and Kuldja. The trade with Bukhara, Kashgar, and Cashmere, then gradually extended. The amicable relations with the Sultans of the Great Horde, the *Dikokamenni Kirghizes*, Kokan, and Bukhara, and the settlement of hitherto disputed points, further conduced towards the development of trade on the Siberian frontier.

Among others, General Glasenap despatched his interpreter, Putimsof, to Kuldja, in 1811, with the object of promoting trade. The information collected by him, and which was published in the *Siberian Journal*, is of a very interesting nature, inasmuch as it affords an account of that little-known part of the country which lies between the fortress of Bukhtarminsk and the Chinese town of Kuldja.

All trade was at first carried on by barter. Russia exported various manufactured goods, iron and leather; while China yielded principally tea, in leaf and bricks; also silks, porcelain, and soft furs. The subsequent appearance of gold on the bazaars had an injurious effect on the exchange of Russian goods. The Chinese willingly disposed of their wares for gold, allowing even on them a considerable discount for specie. The gold supplied at first consisted of Russian coins; but when the Chinese showed a preference for the unalloyed metal, gold in dust and bars formed the medium of exchange.

The Chinese demand for gold induced Russian merchants to enter into a profitable trade for supplying the bazaars with this commodity. Some Russian traders bought up the gold in a legal manner, at the *Nijenovgorod* fair, at Moscow and St. Petersburg, to exchange it for Chinese goods; while others obtained it illicitly from the gold-diggings of the *Kirghiz Steppe*, in the neighbourhood of Chuguchak.

Such was the condition of Russian trade with Western China when the Russian Minister for Foreign Affairs proposed to establish Russian factories within the Chinese territory. In August, 1851, a treaty was concluded between the Russian and Chinese governments, by virtue of which trade was sanctioned at Kuldja and Chuguchak between the subjects of the two empires on the following chief conditions:—

1. The merchants of the two empires exchange their goods and regulate the prices of them at their own option.

2. Russian goods brought to Kuldja and Chuguchak pay no duty to the Chinese Government, even when they pass into the hands of Chinese traders residing within the limits of the two towns; the goods likewise are not declared at Chinese custom-houses.

3. Russian merchants are allowed access to the towns from the 3rd April to the 22nd December; after which date all communication is prohibited until the following spring, owing to the removal during winter of the frontier troops, who examine the invoices supplied to caravans by the Russian Custom-house.

4. Russian Consulates are to be established at Kuldja and Chuguchak, and suitable accommodation provided for them. Buildings for the residence of

the merchants, as well as for warehousing Russian goods brought by Russian caravans, are to be attached to the consulates; the merchants will pay a small sum for the use of the warehouse.

5. The Russian and Chinese traders have free communication with each other for transacting business; but the former will not be allowed to walk in the streets or in the suburbs without a special written permission from the Consul.

6. A separate piece of ground is allotted for grazing the cattle belonging to the Russians.

7. When sheep are brought by Russian traders to Kuldja and Chuguchak, the native authorities have the right of exchanging two out of every ten, paying in return a piece of "daba" or cotton stuff for each sheep.*

8. The traders of both empires, when bartering their goods, are not to part with them on credit; should they do so, no complaint for the recovery of a debt can be entertained by the Russian Consul or Chinese Government.

The export to China of gold and silver in bars, dust, or specie, of firearms, gunpowder, opium, bank-notes, and bills, is prohibited.

In like manner the importation of bank-notes, brandy, and wine into Russia is interdicted.

In order that the Consul may enforce the proper observance of these regulations, each merchant is bound to declare to him, either at Kuldja or Chuguchak, the nature and quantity of the goods imported or exported; the traders are also to state through which customs-barrier their caravans will enter Russia. The Consul may examine the goods, if necessary.

The presence of the Russian Consuls at the factories put a stop to the open trade in gold; its contraband sale, however, could not be prevented. This forbidden trade was chiefly carried on by Tashkendians, who were not under the control of the Russian Custom-house and Consuls. They traded with Russian merchants, and fictitiously bought goods from these merchants in China, who had paid for them in gold; brought them to Semipalatinsk, where they were subjected to an increased rate of 20 per cent. above the ordinary duty, and finally handed them over to their proper owners. Chinese goods in this way were obtained considerably cheaper by the merchants who paid for them in gold, to the detriment of those who traded in the prescribed way—bartering goods for goods. To remedy this state of things, it was found necessary—1st, to establish a stricter watch over the gold-diggings in the Steppe, and particularly over Chalokazaks, or runaways of the Ayaguz district, who are the most active agents in the secret gold-trade, and who supply the Russian merchants with this gold for purchasing Chinese goods; 2nd, to levy a high rate of duty on all teas imported into Russia from China by foreign Asiatics, in order to stop the secret payments of gold to the Chinese; and 3rd, to invest the Russian Consuls with the power of recommending to the Russian frontier authorities the refusal of passes to individuals suspected of illicit trade in gold.

In 1854 the export of tea from Chuguchak by the Tashkendians was so great that a total stagnation in the barter of Russian goods at the factories ensued. Notwithstanding the variety and quantity of Russian goods on hand there at the end of 1853, the Russian merchants procured almost nothing in exchange during the first two months and a half of 1854.

The commercial transactions of the Tashkendians consisted, as already stated, in purchasing tea for gold of Russian coinage. When buying tea in this

* A piece of daba is valued at about 1s. 6d., but the price of a sheep is not less than 4s. 0d.

manner, the Tashkendians estimated 25 half-imperials* at one yamb, or 4½ lbs. of silver. The price paid by them for a box of tea of superior quality was 20 lams of silver, or about 6*l.* 10*s.*; and 18 lams, or 5*l.* 7*s.*, for a box of medium quality.† The price of a box of tea at Semipalatinsk varies from about 19*l.* 10*s.* to 18*l.* 4*s.*, including a duty of 1*s.* 6*d.* per lb. The Tashkendians thus realised a profit of from 4*l.* 17*s.* to 6*l.* 10*s.* per box. The quantity of tea thus exported from Chuguchak during the course of one month may be estimated at about 1000 or 1500 boxes.

In 1856 the Russian trade with Chuguchak and Kuldja ceased, owing to the destruction by fire of the factory and all the goods it contained. In 1858, however, the Consulates were again established at these towns, and the Chinese agreed to pay an indemnity to the Russian merchants of 5500 boxes of tea during the course of three years.

The value and quantity of goods imported and exported through the Semipalatinsk Custom-house may be estimated by the following amount of customs dues levied on them during four years, from 1855 to 1859, deducting 4 per cent. as the cost of collection:—1855, 68,325*l.*; 1856, 9265*l.*; 1857, 9697*l.*; 1858, 8478*l.*

The trade between Chuguchak and Kuldja at the present time, when compared with the years 1854 and 1855, is in a state of decline from the following causes:—1st. In consequence of the increase of the duty on tea imported without consular certificates (by foreign traders), it is principally despatched to the Kirghiz Steppe; and, as the exorbitant duty imposed encourages smuggling, great quantities penetrate secretly into Russia. 2nd. Owing to the non-observance of the law prohibiting the export of gold and silver into China, arising from its licensed circulation in the Kirghiz Steppe, whence, through the absence of guards on the Chinese frontier, it passes easily into that empire. And 3rd. Since the re-establishment of regular commercial intercourse with China in 1858, the Russian trade with that country has not been properly developed, owing to a deficiency of the class of goods mostly demanded by the Chinese, and to the trade carried on in Russian goods by other Asiatics, who likewise supply the Chinese with gold and silver through Tashkend and the Kirghiz Steppe, whence the importation of the precious metals is not prohibited.

It will thus be seen that the Russian trade with Western China laboured in 1858 under very disadvantageous circumstances, and presented a gloomy prospect for the future. No improvement will take place in it until permission is granted for the exportation of gold and silver to Chuguchak and Kuldja, under regulations similar to those existing at Kiakhta. It is only by a reduction in the price of teas exchanged through the factories, a remission of customs duties, and by sanctioning the purchase of tea for part payments in ready money, that the competition for foreign Asiatics can be weakened, and the revenue of the Semipalatinsk Custom-house increased.

The following are the caravan-routes from Semipalatinsk:—1. to Chuguchak through the Ayaguz and Kokpektinsk districts to the southern slope of the Tarbagatal ridge; 2. to Kuldja and Kashgar, through the Ayaguz and Kapal districts; and 3. to Kokan, past Ayaguz, Karkaras, Aktau, across the river Chu, and through Tashkend.†

* A half-imperial is equal to 5 rubles, 15 copeks, or about 17*s.* English.

† For Semipalatinsk, see also Cochrane, Atkinson, and others.

The following Table of METEOROLOGICAL OBSERVATIONS shows the Highest and Lowest Degrees of Temperature from October, 1854, to January, 1860.

1854.		Max.	Min.	1858.		Max.	Min.
October	.. ..	19.0	- 4.5	January	.. ..	- 3.0	-29.5
November	.. ..	5.5	-17.0	February	.. ..	6.0	-25.0
December	.. ..	0.7	-26.0	March	.. ..	22.0	-12.0
1855.				April	.. ..	25.0	- 0.3
January	.. ..	- 2.7	-26.0	May	.. ..	30.5	- 9.0
February	.. ..	0.7	-25.0	June	.. ..	29.0	- 8.0
March	.. ..	13.5	-23.0	July	.. ..	27.5	- 8.0
April	.. ..	21.0	- 6.0	August	.. ..	27.0	- 5.0
May	.. ..	28.0	- 6.0	September	.. ..	22.0	- 3.0
June	.. ..	+27.5	+ 8.0	October	.. ..	-16.0	- 8.0
July	.. ..	+30.0	+ 8.0	November	.. ..	8.0	-17.0
August	.. ..	29.0	5.5	December	.. ..	0.5	-39.0
September	.. ..	22.0	2.0	1859.			
October	.. ..	17.0	- 5.0	January	.. ..	+ 2.5	-26.0
November	.. ..	4.0	19.0	February	.. ..	+ 3.0	-30.0
December	.. ..	3.0	26.0	March	.. ..	+10.0	-18.0
1856.				April	.. ..	+22.0	- 5.0
January	.. ..	- 1.0	-25.0	May	.. ..	+25.7	- 0.0
February	.. ..	2.5	-30.0	June	.. ..	+28.0	- 5.0
March	.. ..	5.0	-18.0	July	.. ..	+27.0	- 8.0
April	.. ..	18.5	-10.0	August	.. ..	+28.5	- 4.0
May	.. ..	25.0	- 1.5	September	.. ..	+20.0	- 1.0
June	.. ..	28.0	- 4.0	October	.. ..	16.0	- 6.0
July	.. ..	29.0	- 8.0	November	.. ..	+ 8.7	-17.0
August	.. ..	28.0	- 6.0	December	.. ..	- 4.0	-26.0
September	.. ..	23.0	- 3.0	Mean Temperature for 1858.			
October	.. ..	14.0	- 6.0	Jan.	- 13.82	July	16.31
November	.. ..	5.3	-14.0	Feb.	- 14.57	Aug.	13.75
December	.. ..	3.0	-22.7	March	- 11.30	Sept.	8.49
1857.				April	4.0	Oct.	2.08
January	.. ..	- 4.5	-25.7	May	10.82	Nov.	2.08
February	.. ..	4.0	-29.5	June	17.33	Dec.	12.47
March	.. ..	3.0	-25.0	Average Yearly Temperature.			
April	.. ..	10.0	-16.0	1.54			
May	.. ..	-26.0	- 3.0	Average of—			
June	.. ..	27.0	- 7.0	Winter	.. ..	- 13.62	
July	.. ..	29.0	- 9.0	Spring	.. ..	+ 1.17	
August	.. ..	30.0	- 5.5	Summer	.. ..	+ 1.579	
September	.. ..	25.0	- 3.3	Autumn	.. ..	+ 2.82	
October	.. ..	16.0	-17.0				
November	.. ..	4.0	-21.5				
December	.. ..	0.7	-24.7				

XXX.—Notes on the Lake of Issyk-kul, and the River Koshkar.

By W. VENUIKOF, Fellow of the Imperial Geographical Society of Russia.

[Translated by JOHN MICHELL, Esq.]

MR. NIFANTIEF, an experienced officer of topographers, was the first, in 1847, to lay down the lake of Issyk-kul with any approach to correctness. Before that date the form of the lake was quite unknown. On Klaproth's large map it has the shape of a square, rather oblong from west to east; a form which was subsequently given to it in later maps. Kiepert in his 'Turan zu Ritter's Erdkunde,' gave it a more correct shape in 1852, from the data supplied by Nifantief. But the excellent map of the Berlin geographer is not very valuable now, after the astronomical determinations made in 1859, and especially after the numerous difficult surveys effected by the staff of the Siberian Corps between 1854 and 1860.

It is the longitudes that are generally wrong in the maps hitherto published of Issyk-kul and the country around. Thus, in the detailed map of the Tian Shan, constructed in 1858 from data acquired by Mr. Zackharof at Pekin, Issyk-kul Lake is shown at least 37 miles more to the east than it really is. The same mistake has been repeated in Mr. Semenof's beautiful little map appended to his 'Ascent of the Tian Shan,' translated for this Society by Mr. John Michell. The Fort of Vernoe is placed there in longitude $95^{\circ} 27'$, while the determinations of 1859 have proved it to lie in longitude $94^{\circ} 45'$. Greater accuracy could not, however, have been expected from labours which had no mathematical basis. Mr. Zackharof was in possession of the list of points determined by Espigny, Hallerstein, and Arochi; but this gives only one point near Issyk-kul with any correctness, namely that of Konur-ulen, of which the longitude is considerably in error, although the latitude is tolerably correct. As far as we know, a more correct knowledge of this portion of Issyk-kul and Fort Vernoe is due to Mr. Voronin, a topographer who observed the altitude of the sun with a sextant which he had himself made. On the strength of these observations the latitude of Fort Vernoe was corrected in the map of Western Siberia published in 1848-55. But, unfortunately, in removing the fort to its proper parallel, it was placed to the east of the meridian under which it was inserted in 1855. This was the great mistake of the cartographers, now reproduced in all modern maps of Central Asia.

Since 1859 the geography of the Issyk-kul basin has been placed on a scientific basis, and last summer the exact figure of the lake was laid down by the topographers under my directions. We ascertained the length of the lake to be 169½ versts (about 113 miles), with a breadth approaching 57 versts (38 miles) opposite the mouth of the river Barskahn. The surface of the basin has been estimated at 116 square miles. I can add but very little fresh matter to the information made public within the last few years with regard to the northern slope of the Tian Shan, between the Zauka and the Koshkar rivers, a locality which was not explored until last summer. We naturally found great discordance in the names of the rivers, and some difference in the shape of the lake; but the direction of the Celestial range and of the Koshkar valley, contiguous to it, proved to be quite correctly laid down in my map of 1859. The inaccuracies of previous accounts are remedied in the present notes.

The surface of the Alpine "Warm Sea" is, as we have seen, 116 square miles. Although the brackish, never-freezing water has not the bitterness of sea-water, yet it so far resembles it in taste that it is not used by the natives, and animals will never touch it. The depth of the lake has not been ascertained; but it is at all events very considerable, its bottom being a continuation of the slopes of the neighbouring mountains, which are very abrupt,

especially opposite the Kes-Sengir and the Tosara River. A shoal is, however, said to exist in the centre of the lake. Some stones are certainly visible below the surface of the lake, and resemble the ruins of a town, but nothing positive can yet be said on this subject. This account is founded partly on tradition, partly on the report that about twenty years ago a Russian deserter crossed the lake on a raft and saw buildings under water. Many human bones have been deposited by the waves on the north shore of the lake opposite the river Tura-aigyr; but it is difficult to determine whether these are the skeletons of the former inhabitants of a town now submerged, or merely the remains of some natives who may have fallen in a fight near the lake of Issyk-kul.

The valley of the Zauka is the last locality on the south-eastern side of the lake in any way available as a camping-ground. Farther west, the vegetation grows gradually more scanty, so that it is difficult to find a night's pasturage for a small number of horses. The soil is partly argillaceous, where it is eroded by numerous ravines, partly rocky; large stones covering the greater part of the shore from the Barskahn to the very Kutemaldy, to a distance of some miles inland from the lake. The same was observed on the north side of the lake, from the banks of the Tchu to the Kes-Sengir; but here the stones are smaller. What appears on the map—from the vicinity of mountains and water—to be a valley capable of cultivation, is in reality nothing but a most miserable steppe.

There are only three or four versts along the Kutemaldy River covered with verdure and juicy grasses; these are not found on the south-west of the lake, with the exception of a narrow zone at the water's edge, overgrown, however, with bushes rather than with grass. There is abundance of grass along the rivers falling into the eastern part of the lake, such as the Tiuba, Djirgalan, Karakol, and other rivers; but this is probably due to the vicinity of higher and more humid mountains. The slopes of the Celestial range are also wooded there. Reeds grow, though in very small quantities, on the southern shore, along the Bar-bulak and other rivulets.

The Kirghizes, nevertheless, encamp on the shores of the lake, retiring to the mountains in summer, where there is at all events some grass, and in winter descending into the valley, then covered, where the rock permits, with a scanty verdure very nutritious for their sheep. The Kungé, or northern shore of the lake, is particularly poor in flora. Even along the valleys of the Diuréu (Diuré-su), Turn-aigyr, and Taldybulak rivulets there are but few "sazes" or places overgrown with grass; the rest of the soil is quite bare, rocky and dreary.*

The Kizyl-ompol or eastern end of the Trans-Tchu range of the Kirghiz Alatau Mountains partakes of the same character. The red slopes of that range, very steep and utterly unwatered from the surface of the Tchu (Koshkar) to the summit, are marked by an entire absence of vegetation. On ascending the Koshkar, grass and partly bushes of the willow species begin to appear, only at a locality called Ortokai, 15 miles from the Kutemaldy. The defile of the Koshkar widens here, forming a valley very convenient for an encampment. But the largest Kirghiz camping-ground is afforded by the valley at the confluence of the Koshkar and the Djuvan-aryk. From this place convenient passes lead across the Celestial range to the Djungal (Kyzart Pass) and the Kara-gudjir, an affluent of the Naryn (Telek Pass). There is a curious formation of rock-salt on the Beja River, between the Kyzart and Telek passes. This salt, though not quite pure, is sufficiently good for use.

There is scarcely any wood on the whole of the northern slope of the

* This prevails, however, as far as the western part of the shore. There are even fields irrigated by the ordinary Kirghiz method beyond the Kes-Sengir, on the Aksu and Karmety rivers.

Celestial Mountains, from the Zauka to the westward. These drawbacks render the country uninhabitable. The Kirghizes occasionally occupy small oases along the rivers, but do not remain long encamped on them. The Alatau Mountains are on this account much to be preferred. Kirghizes are always found encamped on their southern slopes, and half of the Great Horde depasture their cattle there. The scarcity of wood is more especially surprising since the Tian-Shan is apparently more favourably situated, with regard to moisture, than the Alatau chain.* Independently of the vicinity of the lake, the Tian-Shan has considerably more snow; so that, judging by the quantity in which it occurs, the chains at the western end of Lake Issyk-kul cannot be estimated at less than 14,500 feet above the sea-level. We might anticipate the existence of many streams on its northern slopes; but such is not the case. A few rivulets, such as the Tchiishkan, the three Djargylchaks, Tamga, and Barskahn, fall into the lake between the Zauka and Tosara; but farther west to the Kutemaldy, on an extent of 110 verstas (about 75 miles), there are only four small rivers—the Kodji, Ton, Ak-terek, formed by the Konurulen, Ala-Cash, and Ulakol, and three rivulets issuing from the lower ranges, and therefore very shallow. The northern slopes of the Celestial Mountains being very steep, especially opposite the centre of Issyk-kul, the flow of all those streams is impeded by the lower ranges; and this is the cause of their uniting into a small number of channels at a distance from the lake before they pursue their course to the northward.

The Koshkar, or upper course of the Tchu, is the most considerable river on the northern slopes of the Tian-Shan. This turbid stream rises in latitude about $42^{\circ} 7'$, where it is known as the Kyzart. At its head is the Kyzart Pass, the most convenient pass in the whole of that part of the Tian-Shan nearest the lake, presenting the appearance of a saddle on its snowy ridge. After receiving the waters of the Suek, Kara-kol, Shamsi, Djuvan-aryk, Uikek, and Semiz rivulets, the Koshkar becomes so deep as to render it difficult of being forded, and impossible of being crossed through a defile towards the Kutemaldy. Although very considerable, the rapidity of the Koshkar is not so great as that of the Tchu in its passage through the Boam defile, or lower. Even at Old Takmak, *i. e.* 24 miles after it issues from the mountains, the latter has a current of 10 feet per second; the Koshkar but rarely attains a great velocity, and flows visibly slower in the valley where it unites with its affluents. Wood might be very conveniently floated down this river, its bed being less rocky than that, for instance, of the Kok-su to the north of the Ili; but unfortunately there is no wood at all on the neighbouring hills.

On leaving the ravine formed by the lower ranges of the Celestial Mountains, and the eastern end of the Kirghiz-Alatau, the Koshkar sends off a remarkable branch. This is the Kutemaldy rivulet, of which there has been so much talk since the Russians first became acquainted with the Issyk-kul. Our information has been so contradictory and unintelligible, that until last year there was not a single person in Fort Vernoe who could say what the Kutemaldy really was. The more ancient opinion would make the Kutemaldy a channel by which the Tchu receives the waters of Issyk-kul; but the incorrectness of this was proved last year, like other accounts equally wrong. A closer acquaint-

* The barrenness of the mountains which neighbour the western part of Issyk-kul Lake would appear to proceed from the following causes:—1. The steepness of the mountain sides prevents the retention of any atmospheric moisture. 2. The fissures so prevalent in these mountain masses, and particularly in the land-slips, absorb the water. 3. The dryness of the winds which blow from the valley of the Tchu through the Boam defile. And, 4. From the intensity of the sun's rays, which penetrate the transparent thinner strata of the atmosphere. Lake Issyk-kul lies 5200 feet above the level of the sea.

ance with the lake, and a topographical survey of the country around, have proved that the Kutemaldy is merely a branch of the river Koshkar, a bifurcation like the Cassikviari, only on a smaller scale. The whole length of this stream is $3\frac{1}{2}$ versts (about 2 miles); its depth, and therefore breadth, depend on the volume of the Koshkar. In May, 1860, it was 6 feet in some places, and not everywhere fordable. There can be no doubt as to the direction of the current, for the stream flows to the eastward with a rapidity of at least 4 feet per second. We studied on the spot the origin of this stream. The great volume of the Koshkar in turning abruptly to the west, and meeting a projection of clayey cliffs, though of no great height, partly flows off to the right and almost backwards, giving rise to the Kutemaldy, which flows to the east owing to an inclination of the soil in that direction. It may be possible that this branch of the Koshkar was once, as some have reported, an "aryk," or irrigation canal; but this is not very probable, for the following reasons:—

1. It appears strange that a ditch should have been excavated in the lowest part of the Kutemaldy valley, which would prevent the water from being conveyed to the fields.
2. No collateral ditches are observable, and these always accompany works of this nature.
3. The bed of the rivulet is winding, and its banks are not artificially raised, as they would have been had the bed been excavated.

I shall now say a few words about the Celestial range, and the mountain-passes leading over it to the basin of the Naryn River. Its volcanic character is yearly becoming more doubtful; and we found untrue the statement made last year by some Kirghizes, that there was a "burning mountain" at the upper course of the Tchu. Although some of our guides told us they had heard of such a mountain, yet none of them had ever seen it. There are as many as six passes over the Tian-Shan between the Zauka and the Koshkar, over an extent of 220 versts (about 150 miles). The best of these are the Barskaun-asu on the east, and the Kyzart on the west. The Zauka Pass has already been described by Messrs. Semenov and Valikhanov: the local Kirghizes consider it only a tolerable pass, worse than that over the upper course of the Djuvan-aryk on the road to Kurtka. The two passes at the upper courses of the Osar and Aksu (an affluent of the Ton) are very difficult.

I could not but have been much interested in what lay beyond these passes on the southern side of the Celestial Mountains; but of course I could only question the natives on the subject, although I tried to get the most trustworthy information. Even last year I expressed a doubt as to the existence of two parallel chains between the Issyk-kul and the Naryn, and I think this mistake may now be definitely rectified. Not only is there not another row of elevations besides that which gives rise to the affluents of the Issyk-kul, but even the southern face is much more sloping from the crest of the mountains than the northern, so that the elevated Naryn country appears only to rise in small hills. A few rivulets flow off from the Celestial Mountains towards the upper course of the Syr-Daria: the most important of these are the Djaman-ichké, with its affluent the Onarcha; the Sulian-sary; and Kara-gudjir, the greater and lesser, uniting in one stream called the Dergetala. The sources of the Djaman-ichké are contiguous to the Barskaun; the Onarcha rises near the head of the Ton; the Sulian-sary a little more to the west; while the two branches of the Dergetala take their rise in mountains very distant from each other—the greater Kara-gudjir near the Aksa, and the lesser in the vicinity of the Djuvan-aryk. These rivulets first run to meet each other, and, after uniting, fall into the Naryn, one pass above Fort Kurtki.

I obtained very little information about the latter fortification and the neighbouring country; but the little I gathered is of great interest. I refer to the discovery of the situation of the large alpine lake of Son-kul, in a country

neighbouring the upper course of the Djuvan-aryk. This lake, surrounded by the summits of the southern lower ranges of the Tian-Shan, lies midway between the principal chain and the Naryn. Its length from west to east is 18 or 20 versts (12 to 14 miles), and it takes a day to ride round its circumference. The mountains around are not very much above its level; but they must nevertheless be of considerable altitude, as the lake freezes for several months, i. e. it lies above the Issyk-kul, which, as before stated, is 5200 feet above the sea. The only outlet which this basin possesses, viz. the Kadjirty rivulet, flows in an easterly direction, and falls into the Naryn above Kurtki and near the Dergetala. Klaproth has availed himself of some Chinese information in laying down the lake of Son-kul; but neither its position nor extent of surface, as ascertained by us, agrees with previous accounts. The Jesuits have generally omitted to connect the slopes of the Tian-Shan with the valley of the Naryn; we can easily understand why they removed Son-kul to the westward.

Further information respecting the country of the upper course of the Tchu will be gathered from the following itineraries.

I.—From the Kutemaldy to Kurtka.

	Miles.
1. Ortokoi locality, on the Koshkar	14
2. To the Djuvan-aryk	18
3. Aguchak, on the Koshkar, at the confluence of two rivulets ..	
4. Kochanai Spring, flowing into the Kyzart	
5. Kelemché, flowing into the Djungan	
6. Chararcha	
7. Lake Son-kul, over some small mountains	
8. Naryn River	
9. Kurtka Fortress	
9 stages, about	120

II.—Same journey across the Djuvan-aryk.

	Miles.
1. Ortokoi	14
2. Djuvan-aryk	18
3. Telek rivulet, before the Pass, a long, tedious, and rocky ..	
stage	
4. Dolon-sary-bulak (falling into the little Kara-gudjir)	
5. Lesser Kara-gudjir River	
6. Dergetal River	
7. Naryn River	
8. Kurtka Fortress	

III.—From the Kutemaldy to Son-kul on horseback.

1. Ortokoi.
2. Djuvan-aryk.
3. Kyzart, at the Pass.
4. Chararcha (a long journey).
5. Son-kul.

IV.—From the Koshkar to the Talas.

1. At the Pass over the Saek, or rather over Karakol.
2. On the Samsamyr River, equal in size to the Great Kebin.
3. Again on the Samsamyr.
4. Along the Alabil rivulet, over a good pass in the hills at Alabil, also belonging to the basin of the Talas.

XXXI.—The Geography of Bread-Plants.

By Ph. Dr. MICHELSEN.

THE geography of these plants shows us clearly the great changes that have been produced upon the globe through the industry and enterprise of man. What a different physiognomy would not indeed all the countries of the civilized world present to us were it possible to eradicate from their soil all the exotic plants, and to grant life to the indigenous ones alone!

The boundaries within which the bread-plants thrive are usually called the *bread-lines*. The northern bread-line extends farthest in Scandinavia, where, in the 70° N. lat., in a few districts of Finland, barley and potatoes are successfully cultivated. Thence the line declines considerably towards the east and west; and the Faroe Islands, between the $61\frac{1}{2}^{\circ}$ and $62\frac{1}{2}^{\circ}$ N. lat., produce but little barley. Neither in Iceland nor in Greenland, in the 63° , are cultivated the proper bread-plants; nay, on the northern coast of America, the 50° may be considered the farthest point where such plants are cultivated; while Newfoundland, whose southern point lies about parallel with the Bodman Lake, in the $47\frac{1}{2}^{\circ}$, produces even there not any sort of the bread-plant. The line then rises again a little more to the north, and, in pursuing it to the west, we arrive at the western coast of America, at the 57° and 58° . We find it again on the eastern coast of Asia, in the 50° . It is only in the southern part of Kamtschatka that a small quantity of corn is cultivated. Thence the bread-line rises again in the region of the river Lena (Siberia), as far as the 57° ; on the Jenissey River, as far as the 58° ; on the Ob River, as far as the 60° . Thence it reaches Archangel at the 67° , and finally terminates at our starting-point in Scandinavia. These curves of the line exactly correspond with the situation of the countries through which the line passes. On the eastern coast of the two continents the line lies in the 50° N. lat., and rises towards the west in a northerly direction, 20° in the Old World and only 8° in the New. This phenomenon is owing to the colder climate of the American continent, the result, it is supposed, of the position of the magnetic pole. Indeed the *auroa borealis* is there seen more splendidly, as far south as Philadelphia, than at the southern coast of the North or German Sea. This fact might somewhat strengthen the opinion, that the magnetic pole has a more southerly direction in the western hemisphere than in the eastern.

With regard to the southern line, it is almost impossible to define its course. A glance at the map shows how little land there is in the southern latitudes, and how little even of that small portion is devoted to agriculture. We may, therefore, conclude that the curves of the line are not so large by far as those of the northern line, owing chiefly to the different division of the land in the southern hemisphere. The continents form large triangles, the basis of which is in the north, while the southern points are surrounded by seas, and contain a more equal temperature.

In considering the principal bread-plants, such as they are distributed in the various regions in the different parts of the globe, we find on the northern hemisphere—

Rye, Oats, Barley, and Potatoes.—In Asia, as far as the 48° N. lat.; in Europe, 50° ; in America, 40° .

Wheat is in Asia almost entirely wanting, and it is only cultivated in Asia Minor between the 40° and 30° N. lat.; in Europe, between 50° and 40° ; in America, between 40° and 30° .

Rice (*Oryza sativa*).—In Eastern Asia between 40° and the equator; in Europe, south of the 40° N. lat.; in Africa, between 20° and the equator; in Eastern America, between 40° and 30° .

Maize.—In Europe, south of the 40° ; in Africa, between the 20° and 10° ; in America; south of the 30° .

Dates.—In Africa, between 30° and 15° .

Sago-Palms upon the islands of the Malaya and Philippine Islands, between 10° and the equator.

Yam (*Dioscorea sativa* and *aculeata*).—In Asia, Africa, and America, in the tropical climates.

Breadfruit.—Upon the islands of the Pacific Ocean.

Upon the southern hemisphere we meet with yams, cacao, pisang, manioc, breadfruit, potatoes, &c., in the tropical regions.

Rice begins in America on the eastern coast between the 10° and 20° s. lat.

Wheat.—In New Holland, Africa, and America, between the 20° and 40° .

Farro-plants (of the *Cryptogam* division), potatoes, &c., at New Zealand, between the 30° and 50° .

It is not, however, the latitudes, with their various climates, alone that influence the growth of one or the other species of the bread-plants; the cultivation is to a certain extent also the result of the elevation of a country above the level of the sea.

In the midst of the girdle where wheat is chiefly cultivated, in Central and Southern Europe, are also cultivated, upon certain elevations, rye, oats, barley, &c.; while beyond those elevations even the northern products vanish before the increasing coldness of the temperature.

In Asia the cultivation of rice extends at the Himalaya to the elevation of 3000 feet; wheat to that of 10,000 feet; rye, barley, oats to that of 12,000 feet; while on the northern side of the mountain, in Thibet, wheat is grown even at an elevation of 13,000 feet. Humboldt tells us that an elevation of 10,000 on the south side is the extreme boundary for the growth of wheat; while in the high plains of Thibet it is partially grown even at an elevation of 18,000. This vast difference in the boundaries of the girdle or belt is chiefly the result of the snow frontier, which, according to the recent investigations of the brothers Gerard, slopes in the south to 13,000 feet, and in the north to 16,000 or 17,000 feet above the level of the sea. These advantages of the Thibet highlands travellers ascribe to the sun's rays, which strongly reflect upon the mountains from the high plains.

Upon the Andes, especially upon the heights of Peru, maize is grown at an elevation of 12,000 and 13,000 feet. There, as also in Mexico, potatoes thrive at an elevation of 10,000 feet; wheat and other grain at 9000 feet; and pisang, manioc, &c., at 3000 feet.

These two vast mountains of the globe afford thus the principal kinds of breadstuffs known to us. Of subordinate importance are buckwheat, beans, peas, lentils, millet, dhurra (black millet), chesnuts, &c., which are successfully cultivated in various climates; nor are the principal breadstuffs exclusively confined to their respective boundaries.

In the northern belt of rye, oats, barley, and potatoes, we find also buckwheat, beans, and peas. In the belt of wheat, we find beans, peas, millet, dhurra, chesnuts, maize, and rice. In that of dates we find wheat and several other species of grain. In the tropical belt are successfully grown maize, rice, wheat, besides the plants peculiar to the climate.

The bread-plants of the Northern Polar boundaries, which form the standard specimen for whole groups, extend, according to Humboldt, Stroun, and others, west of Asia in the following manner:—

Barley— 60° in Kamtschatka, 58° on Jenissey, 60° on the Ob, 57° to 67° on the Dwina, 70° in Lapland, 60° on the Faroe Islands, 45° in Newfoundland, 50° in British America, 41° in Missouri, and 48° on the Columbia River.

Wheat— 50° on the Kurilian Islands (between Kamtschatka and Japan), on the Altai 55° , on the Ural 58° , on the northern inland seas of Russia 62° to 65° , in Scandinavia 65° , in the Highlands of Scotland 56° to 57° , in Newfoundland 47° , on the Red River 48° to 50° , on the Columbia 45° , and 44° on the western coast of America.

I N D E X

TO

VOLUME THE THIRTY-SECOND.

- ABAL, 217-8, 223-6, 230.
 Abana, R., 76, 80.
 Acagucan, 550.
 Acapulco, 549.
 Acayacan, 554.
 Acayucan, San Martin, 547.
 Achcen Head, 241.
 Acropolis of Cassope, Ruins, 68-9, 72.
 Adelaide, 340-1, 343, 350, 368, 371, 438, 487.
 Adie, 219.
 Adie Island, 130.
 Aduan, 92.
 Aduana Maritima, 544.
 ——— Terrestre, 544.
 Affghan, 312.
 Africa, 63, 97, 237.
 Agoa-Pona, 275.
 Agua Caliente, 546.
 Agua Escondido, 546.
 Ahaura River, 294, 296.
 Ahmed Agha, 87-8.
 Ain-Jenneh, 91-3.
 Ain Sabrun, Fountain, 102.
 Aintab, Aqueduct, 74.
 Aitkin, Mr., 451.
 Ajlun, 93, 97, 105.
 Aklm el Bellan, 105.
 Aklm el Shumar, 106.
 Akyab, 234, 238.
 Albernie Canal, 529, 535.
 ——— Settlement, 529, 531, 533-4.
 Alcantara, S. Pedro de Alcantara, 141.
 Alecock, Sir R., 280.
 Aleppo, 74-6, 79.
 Alfurus, 129-30.
 Algoa Bay, 339.
 Alishereza Valley, 308.
 Aliwal, N., 335, 337-9.
 Alma, 382, 390.
 Almagro, 537, 548.
 Al Makin, 75.
 Alvarado, 554.
 Amalaya Creek, 537.
 Amptonga, 335, 337.
 Amatoya, 257.
 Amazon, 260, 276.
 Amberbaki, 129.
 Ambong Bay, 217, 225.
 Amboyna, 128, 131-2, 134-5.
 Ambracian Gulf, 73.
 America, Central, 57, 234, 250.
 Amoloya, 546.
 Anamites, 144, 157, 162.
 Ananam, 230.
 ——— River, 217, 222.
 Andaman, Great, 111, 113-5, 117-8, 121, 239-40.
 ——— Islands, 109-10, 120, 139, 241.
 ———, Little, 241.
 ——— Strait, 111-3, 118.
 ———, South, 114, 116.
 Andamans, 119-20, 123-6.
 Anderson, Captain Wemyss, 55.
 Ando Tsusimano Kami, 292.
 Angel, Mr., 399.
 Angar, Ruins of, 78.
 Anhoei, 27.
 An-king, 28.
 An-lui-kiow River, 17.
 Annam, 146, 149.
 Annamite Cambodians, 145.
 Ann Creek, 340, 371.
 Antonina, Port, 139.
 ——— Town of, 137, 139-40, 142.
 Apiacar, 273, 277.
 Apicares, 273, 278.
 Apue, 278.
 Arabs, 95, 98.
 Arakan, 237-9.
 Aram, 286.
 Arayacan, 540.
 Arayucan, 537.
 Archer, Mr., 485, 487.
 Archipelago, Eastern, 127.
 Ard Flk, 108.
 Argentine Provinces, 140.
 Arinos River, 268-70, 272, 275-7, 279-80.
 Arrowsmith, Mount, 529-30, 533-4.
 ———, Mr., 150.
 Arta, Gulf of, 69.
 Aru Islands, 127, 131-2.
 Ashburton, Lord, 346.
 ——— Range, 346-8, 350, 363, 366.
 ——— River, 391-2, 426.
 Asher, Tribes of, 107.
 Asia, Central, 312.

- Asia, 26, 215.
 Assam, 29; 307.
 Ass-caps Hill, 13, 30.
 Assunguy, 142.
Atalanta, Her Majesty's steamer, 27.
 Atami, 280.
 Atlantic Coast, 550, 553.
 ——— Ocean, 137, 140, 549.
 Attack Creek, 307, 341-2, 344, 370.
 Attock, 304.
 Augustus, Mount, 391-3.
 Augusta, Port, 371.
 Augusto, Salto, 269, 273-5, 279.
 Austin, 338.
 Australia, 372, 377, 386, 469, 503.
 ——— Central, 411.
 ——— North-west, 393, 401, 405, 411.
 ——— South, 433, 449, 487, 504.
 ——— Western, 504.
 Ava, 109, 198.
 Aveiro, 278.
 Awaj, El Lake, 108.
 ——— River, 80-1, 86, 88.
 Ayun, 101.
 ——— Jin'im Mountain, 101-2.
 Ayuthia, 156.
 Azara, 138.

 Baal Hermon of the Scripture, 103-4.
 Baalbec, 107.
 Bacairis, 270.
 Babber Island, 131.
 Baby, 134.
 Babylonia, 76.
 Baghdad, 79.
 Bagoh, 215.
 Bahadoor, Sir Jung, 304.
 Bah-mo, Village of, 165.
 Bahret-el-Atêbe Lake, 81.
 ——— River, 81.
 ——— Hijana River, 81.
 ——— Kibliyeh Lake, 81.
 ——— esh-Sharkiyeh Lake, 81.
 Baines, Mr., 66, 105.
 Baja, 62.
 Bajour Hills, 307.
 Baju, 232.
 Bajus, 224-6, 228, 230-1.
 Bakhshish, 99.
 Balloo, 455.
 Bamfield, Mr., 529, 533, 535.
 Ban, 54-8.
 ——— Island, 44, 48.
 ——— Prang Village, 154.
 Banana, bird, 263.
 Banda, 131, 133-4.
 Ban-ga-le, 172, 210.
 Banias, 104.
 Banissy River, 108.
 Ban-kok, 149-52, 154, 158, 160-1.
 Banyan, 193, 230.
 Barada Lake, 108.
 ——— River, 80-1, 84.
 Barakat, Family of, 93.
 Barara Tung, 315.
 Barber's pole, 264.
 Barkly, Sir H., 503.
 Barlee Range, 391.
 Barra, São João de, 273, 275, 278.
 ——— Valley, 307.
 Barranco de Pitos, 270.
 Barren Island, 111, 114.
 Barton, Dr., 1.
 Basaca, 545.
 Bassar, 154.
 Basses Rocks, 237.
 Batantá Island, 127.
 Batiki, Mount, 60.
 Batoja, 509, 526.
 Batong, 229, 233.
 Battambang Province, 149-50.
 Batuta, Ibn, 94.
 Bawang, 223, 230.
 Bêche-de-mer, Sea-slug, 49.
 Bêche-de-mer, 115.
 Beckler, Dr., 507-9, 512-22, 524-5.
 Beduin Tribes, 92.
 Beduins, 97, 99.
 Beer's, de, 337.
 Bega, Mount, 60.
 Beke, C. T., Esq., 76.
 Bekesbourne, 100.
 Belad Beshara, 106-7.
 ——— Shukeif, 106-7.
 Belcher, Sir Edward, 218-19.
 Bembe (or Rio del Oiro) River, 63-7.
 Bengal, Bay of, 109, 234-5.
 Beni Aduan, 93.
 ——— Sakhr, 92.
 Benson, Mount, 533, 535.
 Bensusan, M., 42.
 Beyrout, 77-80, 86, 107.
 Bezuidenhout, 337.
 Bhamdün, 78.
 Bhuddist Temple, 33.
 Biak Island, 127.
 Bilik River, 76.
 Billy's Creek, 474.
 Bilpa, 508, 526.
 Bird-Cage Pools, 401.
 Birdmore, Captain, 211.
 Bisay, 232.
 Bisaya, 226.
 Bishop Creek, 341-2, 370.
 Bittunies, 312.
 Black Hill, 422.
 ——— River, 244, 250, 258.
 Blair, Lieutenant A., 109, 112-5, 117, 119, 126.
 ——— Port, 115, 118, 120; 244.
 ——— St., 240, 241.
 Blakiston, Captain, 1, 7, 14, 26, 38.

- Bla-ktyee, 169.
 Blaze, Mount, 416.
 Blewfields Lagoon, 244, 252, 256, 259-60, 262.
 Bligh, Captain, 42.
 Blimbing, 232.
 Blowr, 496.
 Blyth, Mount, 340, 371.
 —, Mr., 119.
 Boca Carra, 536, 545.
 Boetha, 68.
 Bolivia, 269.
 Bombay, 236.
 Bommodee, 164.
 Bonomi, Joseph, 78.
 Borneo, 214-5, 217-8, 221, 228, 233.
 Borokow, 452.
 Boulder Hill, 13, 30.
Bouncer, ship, 3.
 Boutong Island, 128.
 Bouzen, 288.
 Bozra, 108.
 Bozrah, Plains of, 105.
 Brahe, Mr., 431, 438, 442-3, 445, 447-9, 451, 454, 459, 484, 507, 522-6.
 Brahe's Gap, 458.
 Brak, 129.
 Brande, 103.
 Brazil, North, 263.
 Brazo Mistan, 539, 547-8.
 — Apogongo, 539.
 — Apontyo, 548.
 Breaker Inlet, 394, 414.
 Brelum, 142, 144.
 Brewer's Lagoon, 244.
 — Place, 539.
 Brillante River, 138.
 Britain, Great, 260.
 British Columbia, 532.
 — India, 303, 306.
Briton, troop-ship, 114.
 Brockman, R., 372, 375, 381, 387, 390, 397, 406, 429.
 Brown, Mr., 373, 378-80, 387, 389-90, 393, 396, 402, 406-10, 414-5, 419, 424-5, 429.
 Bruce, Mount, 393, 426.
 Brunei, 226, 228, 234.
 Brunner or Kotukuwakaho, 295, 297.
 — Lake, 297.
 —, Mr., 294.
 Buch, L. von, 151.
 Buckingham (Abu-el-Beady), 94-5.
 Buddhist, 193.
 Buena Vista, 548.
 Bugis, 128, 130-1, 134.
 Bukaa, El, 107.
 Buke Levu, Mount, 58.
 Buller River, 294, 296, 298-301.
 Bulloo, 438, 518-22, 528.
 — Creek, 463, 515, 517-8.
 — Plains, 529.
 Bulloo Range, 517-8.
 Bulow, Field Marshal Bapn, 110.
 Bungol, 229-30.
 Bangush Tribe, 308, 311.
 Bunnoo, 311-2, 314.
 — Plains, 312.
 — Valley, 312.
 Burekhardt, 94-5.
 Bureta, 44.
 Burges, Mr. W., 373.
 — T., 373.
 Burjos, 107.
 Burke Creek, 367-9.
 — River, 481.
 —, Mr., 367, 430-9, 445-6, 448-52, 454, 459, 474, 478-9, 481, 485, 487, 492-3, 495, 498-9, 501-2, 505-6, 508-12, 515, 517-8, 522-9.
 Barmah, 20, 23.
 —, King of, 198.
 Burman, 181, 197, 199, 212, 214.
 — Government, 170.
 Barmese, 124, 167, 174, 186, 191, 196, 210-1.
 Battunic Hills, 317.
 Bways, 181.
 Bytinga, 68.
 Cabul, 310.
 Cachoeira River, 139.
 Cacique Cocipopi, 544.
 Cakobua, King, 51.
 Calcutta, 110, 116, 118-9, 124, 126, 234, 239, 313.
 California, 49.
 Callapiever or Cookally, 267.
 Camarina Village, 68-9, 72.
 Cambodia River, 142.
 —, King of, 142, 146.
 —, 144-6, 148-50, 153-4, 156-7, 159, 161, 163.
 —, the Lao country, 142, 146, 148.
 Cambrian, H.M.S., 237, 241.
 Camellia, 287.
 Camel's-hump Hill, 3, 30.
 Cameron, Cape, 244.
 Camfield, 354, 358, 361.
 Camitan, 554.
 Campbell, Captain, 111.
 —, Port, 116, 119.
 Campinas, 275, 277.
 Cana, 90.
 Canaan, 90, 138-40.
 —, Land of, 92.
 Canal, Great Imperial, 27.
 Canton, 5, 13, 27.
 — River, 26.
 Capoeiras, 276.
 Capricorn Range, 391-2.
 —, Tropic of, 468.

- Carlos, St., Fort, 259.
 Carmel Mountains, 93, 104.
 Car-Nicobar Island, 241.
 Carpectaria, 459, 463, 466-7, 471-4,
 476, 487, 489, 493, 497, 502-4, 507,
 526.
 ———, Gulf of, 358, 361, 365,
 430, 438, 439.
 Carrawaw, 453.
 Carreta, 553.
 Carretan, 553.
 Carriapundy Swamps, 430.
 Carruthers Creek, 344, 364.
 ———, John, Esq., 344, 364.
 Cartago, 260.
 Carube, 63.
 Cashan Hills, 65.
 Cassope, City of the Cassopæi, 73.
 Castro, Town of, 137, 140.
 Cataquara Hill, 277.
 Catherine, St., 137, 140.
 Cato, Mr. G. C., 339.
 Caxoeira de Apuê, 269.
 ———, Todos os Santos, 275.
 Cayoltepec, 539.
 Cayuns, 141.
 Cedars (Mekmel), 103.
 ———, Mountains, 106.
 Celebes, 128.
 Ceram, East, 128, 131-3.
 ———, Laut Islands, 134.
 Centinel, North, 116.
 Cerro Prieto, 538, 541-2, 546, 554.
 Cerros de Albrisias, 538.
 Cerro de Guaycamayo, 546.
 Cerros de los Amates, 545.
 ———, Piedra Parada, 538.
 ———, Prieto, 537, 552.
 Ceylon, 229, 232, 236-7.
 Chacalapa, 540.
 Chacorão, 276-7.
 Chalapume Town, 154.
 ———, 156, 158.
 Chain of Ponds, 357, 358-9, 361.
 Chaiquita, 63.
 Chagú, 141.
 Chalchijapa, 540.
 Chalybon, 82.
 Chamberlain, Brigadier-General, 306-7,
 315-7.
 Chambers Creek, 547.
 ———, Mr., 369, 371.
 Champion Bay, 372-3, 377, 399, 423,
 427.
 Chandless, W., Esq., 268.
 Chiang, 159.
 ———, Mai, 160.
 Chang-show (hien), 13, 21.
 Chantabun, 149.
 Chatham Island, 109, 112, 114.
 Chiapos, 554.
 Chicandana, Town, 63.
 Chicapa, 542, 546.
 ———, Arriba, 546.
 Chichester Downs, 385, 394.
 Chiculacualla, 67.
 Chiculalahalla, 63.
 Chihuitan, 545.
 Chikiang, 5, 6.
 Chimalapa Mount, 538, 540, 550, 553.
 Chimalapilla River, 539.
 Chimameca, 553.
 Chimamua, 547.
 Chinese Tartary, 305.
 ———, Tibet, 307.
 ———, 159, 160.
 China, 4, 71, 26, 35, 37, 41, 49, 127,
 150-2, 160, 214, 234, 293.
 ———, W., 23.
 ———, Sea, 235.
 Chi-shin River, 26.
 Ching-kiang-fu, 27.
 Ching-tu, 10, 11, 13-16.
 Chin-kiang, 32.
 Ching-tu, 17-8, 21-3, 26, 36.
 Chivela, 546.
 Choachapa, 539, 540.
 ———, River, 538.
 Chumkunni, 310.
 Chung-hien, 12.
 Chung-king, 2, 11-4, 16-8, 21-3, 26, 36,
 38.
 ———, Bishop of, 37.
 Cinque Islands, 111, 115.
 Cinzas River, 137-8.
 Cinqatula, 553.
 Cloncurry, 472-4.
 Cochín China, 144-5, 148-50, 160, 162.
 Cochrane, Sir T., 225.
 Cofradia, 546.
 Colebrooke, Lieutenant, 109, 126.
 Collinson, Lieut.-Col., R.E., 68.
 Comactepec, 553.
 Comet, 360.
 Comitancillo, 554.
 Comitanillo, 454, 545.
 Comorin, Cape, 236.
 Couda, tribes of, 141.
 Convento, 538.
 Cook, Captain, 42.
 Cookra River, 262.
 Cookras, 259-60.
 Cooper's Creek, 430-1, 433, 438-40,
 442, 444, 446, 452, 458-63, 465-7,
 471-6, 485-8, 493-5, 500, 502-5, 514,
 517-8, 522-3, 526-9.
 Cooper, Port, 294, 297.
 Coorkerega or Kokriegra, 508, 526.
 Corfu, 74.
 Cormorant Rock, 34.
 Cornwallis, Port, 109, 111, 114, 117-9,
 241.
 Coroados, 141.
 Coromandel, ship, 3, 237.

- Corrientes, 137.
 Cortez, F., 546.
 Cossack, 194.
 Costa Rica, 260.
 Cosuliacaque, 547.
 Cotinga Island, 139.
 Craggy Island, 112.
 Creporé River, 277.
 Crusades, 94, 106.
Cryptomeria Japonica, 287.
 Cuatá, 278.
 Cubatao River, 140.
 Curityba capital, 137, 139-40.
 Cuvier, Cape, 374.
 Cuyabá, 276, 278.
 Cuyabauos, 276, 278.

 Dacoits, 198.
 Dahombang (or Hobang), 224.
 Daimio, 291.
 Damascus, 77-83, 85-6, 88, 90, 93, 101-2, 104-5, 108.
 Damios, 282-3, 291.
 Dalbergia Sissoo, 317.
 Dalrymple, 223.
 Dara Ishmael Khan, 304-5.
 Darling, R., 431, 438, 453, 459, 469, 484, 487, 503, 505, 507-9, 522, 526, 528, 529.
 Datu, 226.
 Daubeny Ranges, 440.
 Davis, Mr. J. S., 373, 411.
 Dead Sea Expedition, report of, 94, 96.
 Decima, 281.
 Deir el Kamar, 106.
 Delagoa Bay, 65, 66.
 Delambre Island, 374, 425.
 Degei, 56.
 Dejan, Beit, 100.
 Delhi, 306.
 Denham, Captain, 42-3, 57.
 Departure Bay, 532.
 Depuch Island, 394, 397.
 Derajat, N., 304, 306, 312.
 Derwesh Khel, 311.
 De-tipo, 166.
 Diab Sheikh, 93-4, 97.
 Diamantino, Villa do, 269.
 ——— River, 269-71, 276.
 Dilli, 90.
 Dixon, Captain, 372-75, 380, 400, 424, 429.
 ——— Island, 424.
 Dhoons, 312-314.
 Djebel Ajlun (Mount Gilead), 104, 108.
 ——— el Heish, 105, 108.
 ——— Rihau, 106, 107.
 ——— Sheikh (the Old Man's Mount), 102.
 ——— Haniu, 106-8.
 ——— Tibinú, 106-7.

 Djebel Mekmel, Mount, 106.
 ——— Safet, 104.
 Dobbo, Village of, 131-2.
 Doce River, 140.
 Doergens, Dr., 96.
 Dolphin, barque, 372-3, 375-7, 380, 398, 400, 423, 424-5, 428-9.
 Dolphin Island, 374, 427.
 Domingo, St., 541.
 Don Garca, 553.
 Dong Phya Phaie Mountains, 153, 155-6, 161.
 Dour, 311.
 ——— River, 312.
 ——— Valley, 312.
 Dorey, 129.
 Dost Mahomed Khan, 306.
 Dragenberg, 66.
 Drakensberg, 337-9.
 Drummond, J., 373.
 Druzes, 108.
 Du Boulay, F., 373.
 D'Urban, 335.
 Durgan, Sheikh, 93.
 Duroodo, 508.
 Durwesh Khel Wuzzeris, 306, 312.
 Dyaks, 214-5, 226-7, 232.

 Edhr'a, 88.
 Edmondstone, Mr., 336.
 Edmund River, 390-1.
 Een (*Diptirocarpus alatus*), 184.
 Eeng-thai-gyee, 169.
 Eing Thoogyee, 166.
 El Arroyo de la Cueva, 552.
 El Banco del Marques Creek, 541.
 El Barrio (de la Solidaridad), 546, 549, 553.
 El-Beije, 89.
 Elchico, 553.
 El Corte, 558-9.
 Elephant River, 66.
 Elgin, Lord, 27.
 El Gáb, Lake, 90.
 El Jumnapa or La Puerta River, 541.
 El-Hosn, 90.
Eliza, brig, 42.
 Elk River, 530, 534.
 Ellery, Robert L. J., 503.
 El Marquisano, 546.
 El Mongón River, 541.
 El Pachinó, 541.
 El Portillo de Tarifa, 538.
 El Rio de Amaloya, 541.
 ——— los Perros (Dog River), 541, 545.
 ——— Tarifa, 541.
 ——— Tehuantepec, 542.
 ——— Jatapu, 540.
 ——— Verde, 541.
 Emin Pasha, 86-7.
 Enu Creek, 405.

- Encantada Mount, 537.
 Enchanacha, 339.
 Enderby Island, 380, 427.
 England, 128.
 Eng-thoo-gyee, 212.
 Entrance Island, 532.
 Epirus, 68, 73.
 Epirote, 69.
 Erdkunde (Palästina und Syrien), 95.
 Erskine, Admiral J., 42, 55.
 Esdraelon, Plains of, 93, 104.
 Eshmiskin, 86, 88-90.
 Esh-Shām, 87.
 Espinal, 545.
 Espinosa, 538.
 Esquino Grande, 553.
 Esquina, 553.
 Estero de Estaca, 545.
 Eucalyptus demosa, 344-5.
 Euphorbia, 193.
 Euphrates, River, 74-7.
 Europe, 234.
 Exmouth Gulf, 391.
 Eyre's Creek, 459, 461, 464-5, 486, 489,
 504, 507, 526.

 Fa Ban Galay, 207.
 Faivre, Dr., 141.
 False Point, 237.
 Feixos, 278.
 Fera, 64.
 Ferguson Creek, 350-1.
 ———, P., Esq., 350.
 Fergusson, Lieut., 235.
 Fewarney Doodnath, Brahmin Sepoy,
 120-4, 126.
 Fie, 162.
 Fiji Islands, 42, 48, 50-2, 54, 56-8, 60-2,
 78.
 Fik, Village of, 108.
 Fincke, Mr., 371.
 Fizen, Prince of, 288.
 Flacotepec, 545.
 Flinders River, 503.
 Flototeno, 548.
 Flood's Creek, called Wa-ya-Boorla,
 510.
 Flora, 316.
 Fortescue, 395.
 ——— River, 385-7, 394, 428.
 Forbes, Mount, 472.
 Ford, Rev. J. C., 74.
 Foulwind Cape, 299, 300.
 França, Senhor B., 271.
 Frangipan, 548.
 Franks, 94.
 Freikh, Sheikh Diab ibn, 93.
 Fremantle, 372, 400.
 Fu (Chow), 12.
 Fung-siang Gorge, 91.
 Fusayama, Mount, 280.

 Fusung River, 13, 17.
 Fytche, Major, 111.

 Gadara (or M'kes), 90.
 Gadarenes, 92.
 Gading, 224.
 Gage's Roads, 425.
 Gagnier, 75.
 Galilee, 92.
 Galle, Point de, 236.
 Galley Asp, 265.
 Galoa Bay, 57-8.
 Ganges, 152, 238.
 Ganjam, 238.
 Gantisan, 217, 226.
 Gara Bay, 217, 219.
 Garnett, Captain, 305.
 Gascoyne, 377, 381.
 ——— River, 382, 389, 427.
 Gassanides, 90.
 Gawler Town, 350.
 Gaulanitis, Table-land of the, 104-5.
 Gan, Mount, 60.
 Gaya Bay, 228, 230-1.
 ——— Harbour, 218.
 ——— Island, 217-8, 231-2.
 Gebele, King, 90.
 Geelvink Bay, Great, 127-9, 131.
 George, St., Island, 12.
 ——— Channel, 422.
 Gesenius, 104.
 Ghabāghib, 87.
 Ghazule, Village, 86.
 Ghizdis, 312.
 Ghôr Lake, 93-5, 98-9, 100-8.
 Ghuznee, 305.
 Ghuzni, 303, 305, 310, 316.
 Gilboa, Mount, 93.
 Gilcad, Mount, 76-7, 86, 89, 90, 92.
 Ginambur, 227, 229.
 Gleeson Creek, 363.
 ———, E. B., Esq., 363.
 Glen Herring, 405.
 Goatzacoalco Forests, 550-1.
 ——— River, 537-9, 540-2, 546,
 548-9, 554.
 Golden Reach, 36.
 ——— River, mouth of, 3.
 Gold-sand River, 40.
 Gomul River, 305.
 Gongen Sama, 282.
 Goodiar Creek, 340, 371.
 Goose Point, 337.
 Goram, 128, 130-5.
 Gordenia, 287.
 Gordeware Point, 237.
 Gorgulha, 271.
 Gould, 408.
 ——— Mount, 504.
 Goyah "Tseet Poing," 195, 198.
 Goyaz, Province of, 138.

- Gracias à Dios, Cape, 248, 260.
 Gray's Creek, 464, 485-6.
 Gray, Mr., 373, 430, 438, 483-4, 487, 526.
 Great Lake, 150.
 — River, 248.
 — Temple Hill, 4.
 Greenbough Flats, 400.
 Greenwich Observatory, 149, 502.
 Green's Creek, 473.
 Gregory, F. T., Esq., 358, 361, 372.
 Gregory's track, 438, 487, 504, 506.
 Grey River, 294, 297-300.
 Greytown, 252.
 Guana, 264.
 Guapinoloya, 548.
 Guaraguassú River, 139.
 Guarakessaba River, 139.
 Guarapuava, 137.
 — Town of, 140.
 Guaratuba, 138.
 — Bay, 140.
 — Port of, 140.
 — Town, 137.
 Guardafui, Cape, 237.
 Guatemala, 260, 536, 553-4.
 Gubbur, Mount, 316.
 Guezaltinango, 554.
 Guiana, 263.
 Guinata, Mount, 538.
 Guichicovi, San Juan de, 538, 547.
 Guicila, Mount, 541.
 Guiengola, Mount, 552.
 Guixila, Mount, 552.
 Guione, 63.
 Gumbela, 312.
 Guinea, New, 127, 129-31, 135-7.
 Guirhilona Mountains, 538.
 Guizotenango, 555.

 Haikoras, 295.
 Haj Road, 88, 90.
 Hakodadi, 281.
 Halbun, Village, 82.
 Haleb, City, 82.
 Hall, Hon. G., 366.
 — Mr., 421, 426, 429.
 — Mount, 366-7.
 — W. S., 372, 374.
 Hamersley and Co., 373.
 — Range, 385-9, 393-5, 404, 428.
 Hamah, Plains of, 105.
 Hamilton's Account of the East Indies, 109.
 Hamilton, Mr., 224.
 Hammed (Mohammed Enim), 91.
 Han, Junction of, 1.
 — River, 27.
 Hankow, 1-7, 10, 18, 20, 22, 27, 29, 31-2.

 Harbour, Old, 109, 114.
 Hardey, 390-1, 393.
 Harding, Mr., 373, 375, 380, 390, 393, 396, 400, 402, 404, 408-10, 414-5, 424, 426, 429.
 — River, 422.
 Hargusana, 540-1.
 Harran, 90, 100.
 — (Haran, or Charran), 76-7, 80-2, 84-6.
 Harrier, H.M.S., 58.
 Harrismith, 339.
 Hasbany River, 108.
 Hasbeiya, 79.
 Hasheiya Town, 101, 107.
 Hati-cune, 149.
 Hastings, Warren, 237.
 Hauran, 87-9, 92, 104-5, 108.
 — Plains of, 79.
 Haui Islands, 425.
 Haverfield, Mr., 509-10.
 Hawker Creek, 348, 350, 363.
 — J., Esq., 348.
 — Mount, 365-7.
 — Hon. G. C., 365.
 Hayward Creek, 370.
 Hazlewood, Dr. David, 48.
 Hearson Cove, 398, 423.
 — Mr., 377, 379-80, 398.
 Heathcote, Lieut., 110, 115, 125, 234.
 Hecate, H.M.S., 529.
 Heen-Fung, Emperor, 21.
 Hejra, 94.
 Helfer, Dr., 109-10.
 Helix Manhuti, or Bulim, 163.
 Hell's Gate, 337.
 Herald, H.M.S., 42.
 Herefordshire, ship, 241.
 Hermesdorf, Herr M. G., 536.
 Hermes, S., 337.
 Hermon, Mount, 92, 100-8.
 Hernan Cortez, 547.
 Herodotus, 122.
 Hersha, Ain, Temple of, 104.
 Hiang-tang, 2, 4.
 Hibbaryeh, Temple of, 104.
 Hidalgotitlan, or Los Almagros, 548.
 Hill, Mount, 372.
 Himalaya Mountains, 1, 26, 215, 304-5, 312.
 Hindoostan, 307.
 Hindustan, 121, 123, 215.
 Hioga, 280, 284, 288-9.
 Hirundo esculenta, 115.
 Hochapa Creek, 537.
 Ho (Chow), 21-2.
 Hodgkin, Dr. Thomas, 142.
 Hodgkinson, Mr., 507-10, 512-20, 521-5, 529.
 Hobia Village, 14.
 — Town of, 31.
 Hokiang, City, 38.

- Hokiang (Hien), 17.
 Honduras, 244, 252, 260.
 Hon-ga-louk-Khyoung, 165, 168.
 Hooghly, 238-9.
 Hoo-nan, 26, 29.
 Hoo-peh, 26, 35-6.
 Hope, Admiral Sir James, 1, 3, 27, 288.
 Hopeless, Mount, 431, 433, 438, 449, 487, 494.
 Horne, Lake, 530.
 ———, Mr., 533.
 Horsburgh, 234, 237.
 Ho-tow, or Hokiang, 13-4.
 ——— River, 13, 26, 38.
 Hottentots, 339.
 Howara, 89, 90.
 Houpeh, 9.
 Howitt, Mr. A. W., 430.
 Hpo Khai, 203, 207.
 Hpoo-Loo, 178-9, 181.
 H'tou-h'po, 164-5.
 Huasantan, 540.
 Huatuleo, 536.
 Huaves, 536, 546.
 Hudibras, 213.
 Hu-du-kow, 5.
 Hugh, 354.
 Hughes, Mr., 70-1, 73.
 Huilotepec, 544.
 Huimangillo, 549.
 Huimargillo, 554.
 Hùleh, Basin of the, 104, 106, 108.
 Hulin, 12, 36.
 Hunan, 2, 3.
 Hungoo, 368.
 Hunter Creek, 344-6, 363, 368.
 Hunt, Mr., 46.
 Hurjille, 86.
 Hurriab Valley, 310.
 Hurunui, 294-5.
 Huss, John, 287.
 Hwangechow, 5.
 Ibis, River, 339.
 Ichang-fu, 6-10, 12-3, 18-9, 22, 32.
 Ichang, Great Gorge, 33.
 Idaan, or Dusun, 222, 224-30, 232.
 Igarapé Pary, 271.
 Iguape, 140.
 Ildefonso, Treaty of, 138.
 Inchitan, 553.
 India, 41, 110, 126, 307, 310, 336.
 ———, Government of, 109-10.
 ———, N.W., 26.
 ———, Plains of, 1.
 Indian Sea, 235.
 Indians, 247-9, 251-4, 256-7, 261-4, 267, 271-2.
 ———, Parexis, 270.
 ———, North American, 255.
 Indus, 304-5, 312, 316.
 Ingoane, 63.
 Ingoana, 68.
 Inhambane, 63, 65-6, 68.
 Inongahua, 299, 302.
 Inzerban, 221, 228.
 Interview Island, 113, 116, 120, 124.
 Irrawaddy, Valley of the, 166, 190, 214.
 Iseulapa River, 539.
 Ishilly, 264.
 Ishuatlan, 548, 554.
 Islam, 225.
 Itaituba, 269, 278-80.
 Istaltepec, 542, 545, 553.
 Istapa, or San José de Guatemala, 537.
 Itararé River, 137.
 I-tu, 32.
 ——— (hien) Chin-kiang River, 6.
 Iturea (Jaidûr), 105.
 Ivahy River, 137-8, 141.
 Jabbok, Ford, 96.
 Jacquerie, 283.
 Jaffa, 100.
 Jagis, 311.
 Jaidûr, El, 108.
 Jalapa, 542, 553.
 Jaltepec River, 537, 541-2.
 ———, Upper, 550-1.
 Jaltipan, 553.
 James, A., 372, 429.
 Jamnapa River, 554.
 Janetepec, 553.
 Japan, 280-2, 284-5, 288-90, 292.
 Japanese, 290.
 Jatipan, 547.
 Jaulán, 89.
 Java, 127, 184.
 Jawlan, 105.
 ———, Table-land of, 108.
 Jebel Ajlûn, 89-91.
 Jebel Hauran, 88.
 Jebel Mânî'a, 86.
 Jebel-esh-Sheikh, 89.
 Jemadar, Mussulman, 179, 205.
 Jemûn, Jib, 107.
 Jerash, 92.
 Jeronymo, S., 141.
 Jerusalem, 100.
 Jisr Burjos, 106.
 Jin'im, Fountains of, 102.
 João de Barra River, 269.
 Jobie Island, 127, 129.
 Johnston, Captain, 305-6.
 John's Plain, 342.
 Jopim River, 137, 141.
 Jordan, River, 76, 88-9, 92-100, 108.
 Juchitan, 542, 545.
 Junis Tungi, 314.
 Jupiter's 1st satellite, eclipse, 451.
 Juruena River, 268, 272, 275, 280.

- Rabatuan River, 217-8, 222, 226, 330.
 Kabul, 303, 306-7, 311-12.
 — Khel, 311.
 — Wazeeris, 305.
 — River, 307-8.
 Kadavu, Mount, 52, 57-8, 60, 62.
 Kaho-Deng, or Deng Mount, 151.
 Kaiapoi, 294.
 Kala-tee-nee-noung, 179.
 Kalaat el Shukeif, or Belfort Castle, 106.
 Kal'at Jendal, Village, 100.
 Kalawat, 230.
 Kallahs, 202.
 Kalapis, 224, 233.
 Kamput, 149.
 Kandahar, 303, 305, 310.
 Kanga, King, 283.
 Kanigoorum, 314-7.
 — Town, 312, 314-6.
 Karachi, 304.
 Karen, 170-2, 180, 183, 190, 192, 200, 202-3, 206-7, 211, 213.
 Karen-ni Yaings, 173-4, 182.
 Karen-ni, 164, 169, 171, 173, 175-6, 178-80, 182, 184, 186, 191, 194, 197-8, 200-2, 207, 211.
 Karen Na-Khans, 164, 172.
 Karens, 164-9, 171-4, 176-80, 182, 184, 187, 189, 191-4, 196-7, 210-2, 214, 216.
 Karen tribes, 185.
 Kariens, 151.
 Karriapundi Plains, 516, 524, 525.
 — Swamp, 515-7, 524.
 Kassa, 123.
 Katrine Lake, 294.
 Kanātir Fil'on, Aqueduct, 90.
 Kantavu Island, 44.
 Kava Root, 45.
 Kayan, 226.
 Ké Island, 127, 131-3.
 Keffing, 134.
 Kefrenji, 91-2.
 —, Sheikhs of, 93.
 Keipert, Dr., 95.
 Keipert's Map, 95.
 Kekwick, Mr., 343, 350, 353-5, 365, 371.
 — Ponds, 341.
 Kelat-em-Mezarib, 89.
 Kellie Castle, 237.
 Ken-kiang-hien, 27.
 Kenne Thuo, 159-60.
 Keppel Creek, 458.
 Ketshwayo, 337.
 Keyti, 311.
 Khai Mahpai, 207.
 Khai-ma-bpee-khyoung, 202.
 Khai Mah-pee Khyoung, 208.
 Khao Samroun, Mount, 151.
 — Tangoune, 149, 151.
 Khirgiz Steppes, 312.
 Khmer Dome, 153-4.
 Khost River, 311.
 Khūweh, or brotherhood, 99.
 Khyber Valley, 307.
 Khye Khyoung, 208-9.
 Khyoung-h'neel-gwa, 165.
 Khyssore, 317.
 Kia-ding, 13, 17, 18, 22.
 Kiau, 220, 222, 226-9, 231-3.
 Kiang-an, City, 38.
 — (hien), 17.
 Kiang-how, 5.
 Kiang-si, 27.
 Kiang-su, 27.
 Kiangtse (hien), 16.
 Kien (chow), 22.
 Kien-we, 22.
 Kilwaru Island, 134.
 Kimonga Hill, 296.
 Kina Balu, 219-24, 229, 231, 233.
 — Mount, 218.
 — Batangan, 221.
 Kin-cha-kiang, or River of Gold, 19.
 Kin-chow (fu) 4, 5, 31.
 King, Captain P. P., 377, 397.
 — George's Sound, 51.
 — -yen, 21.
 — John, 430-1, 438-9.
 — -kow, on the right bank, 2, 22, 29.
 —, Mr., 449-54, 459, 474, 481, 487, 491-5, 498-502, 526.
 —'s Creek, 472, 486.
 — William's Town, 339.
 Kin-ho-kōw River, 3.
 Kini Taki, 224.
 Kinnaird, Port, 44, 57-8.
 Kin-shu (hien), 22.
 Kinsin, 280, 285-8.
 Kin-tin-tze Island, 39.
 Kiok-kih, 22.
 Kissarah Valley, 313, 315-6.
 Kiswe, 86-7.
 Kitto, Dr., 103.
 Kohat, 314.
 — Pass, 307-8, 310.
 Kokura, 285, 288.
 Ko-Lau-Karens, 177-9.
 Kolialto, 454.
 Koliatti Creek, 458.
 Ko-Mun Island, 149.
 Koporingan, 221.
 Korat, 150, 152-9.
 Korat-Ongcor Aithe, 153.
 Koo Lhoo Khyoung, 172-4, 176-7, 180.
 Koon-Khyoung, 165.
 Koon-Sha, 192, 200.
 Koon Tee, 193.
 Koorlegur, 439.
 Koorliatto Creek, 515, 517-20, 522, 523-4.
 Koornbirri Range, 510-11.
 Koorum, 309, 310.
 Koorum River, 303, 310-12.

- Koorum Valley, 305-6.
 Kosi River (or Gold-downs River), 335.
 Kō-Sutin, Isle of, 143.
 Kōth, Dr. J. R., 103.
 Kotukuwakaho or Arnould River, 297.
 Koung, 190, 224, 227, 229, 233.
 ——— Yai, 202.
 Kouis, 150.
 Krome Loucong Wongsa, 152.
 Kuaichow, 13, 35.
 ——— (fu), 10-12.
 Kulaat el Husn Village, the Gamala of Josephus, 108.
 Kunaiterah, El, 108.
 Kunayseh, 106.
 Kurano, 317.
 Kurram, Fort, 310.
 Kuruduadua, Chief, 58-60.
 Kung, Prince, 11.
 Kung-tan-ho, River, 13, 26.
 Kuweik (Quoik, Kowick, Koeik), River, 74-6.
 Kwan (hien), 22.
 Kwei, 35.
 Kweichow, 9, 14, 17, 22, 23, 26, 36.
 Kwoon Tee, 171, 190, 192-3.
 Kwoon-Sha, 196.
 Kyah-hpo-gye Moung-Hpoo, 194.
 Kyau Pee Tee, 186, 189, 191, 194-6, 199-204.
 Kyan-pu-tee, 173.
 Kyans, 215.
 Kyay H'po, 198-9, 207.
 Kyay-h'po-gye, 171, 173, 176.
 Kyay-Hpo-Gyee, 183, 186, 189, 191, 193, 195-8, 200-1, 203-4, 206, 211, 214.
 Kyay-hpo-ngay, 193-5, 197.
 Kye-dzeis, 213-4.
 Kye-dzee, 181.
 Kyet-thoung-Khyoung, 164.
 Kyet-Teik Village, 166.
 Kvetoung, 211.
 Kyonk Gyee, 202, 206, 211.
 Kyonk-pa-te-Khyoung, 164-5.
 ——— Valley, 165.
 Kyonk-ta-da, 166.
 Laban, 86, 226.
 Labang-Labang, 224, 229.
 La Barilla, 540.
 Labyrinth Island, 115-6.
 La Crimega, 545.
 Lagoon Superior, 542.
 Laguna Superior, 541, 545.
 Lake Station, 295.
 La Horqueta, 539.
 La Irmanda, 533.
 Lakeha, 53.
 Lakemba Island, 44, 48.
 Lambert, Cape, 398, 424, 426.
 Lanun, 232.
 Lanuns, 224-6, 230-1.
 Lane, C. B., Esq., 269.
 Lao, E. and W., 152-8, 155, 157, 159.
 ——— Mountains, 155.
 Lao-Juene, 157.
 ——— (Langoutis), 154.
 Laollaga, 545.
 Laos, 149, 151.
 ——— tribes, 145.
 Laotians, 159, 162.
 Lapunta, 553.
 La Puerta Pass, 541.
 ——— River, 537.
 Larrey Point, 415.
 Las Marias, 553.
 Lassa, 1, 26.
 Las Vacas, 553.
 Lat-kta, 192.
 Laucala Bay, 58.
 La Urivela, 537, 554.
 La Vacaqueña, 539.
 La Venta, 542.
 La Ventosa, 544, 554.
 ——— Bay, 536-7, 542.
 La Vinta, 553.
 Lawson Creek, 351-2, 354-5, 363.
 ———, Dr., 351.
 Lay-khoo, 174.
 Laya Siksa River, 245.
 Layer Layer, 225.
 Laymun, 172.
 Leake, Col., 69-73.
 Lebanon, Anti, 105-7.
 ———, Mount, 78-9, 92, 103-7.
 Leddan River, 108.
 Ledja, 108.
 Legation, Japanese, 290, 293.
 Legendre Island, 374.
 Leh-khoo, 172.
 Leibig, Dr. G. von, 114.
 Leichhardt's track, 504.
 Leja, 88.
 Lennard, Mr., 389.
 Leontes River, 106-7.
 Lesueur, Mount, 372.
 Leuye, 158.
 Levuka Bay, 57.
 ——— Harbour, 43-4.
 Ley-pay-guay, 168.
 Ley-pya-gye, 167, 176, 186-7, 191.
 Ley-pya-gyle, 168, 213.
 Ley-pya-nyay, 167.
 Li-chuan-pa, 17, 22.
 Lignum Vita, 262.
 Ligon, C. W. V., 503.
 Lilinta Village, 130.
 Limbang, 232.
 Limin, 13.
 Limpopo River, 63, 65-6.
 Lincoln, Port, 351.
 Lingoa Geral, 273.
 Lisle, De, 65.

- Little Temple Hill, 4.
Liverpool, cutter, 536.
 Livingstone, Dr., 65.
 Lobb, Mr., 219.
 Lochee River, 312.
 Lo-je-kow, village of, 2.
 Lokporin, 217.
 Lome, 158-9.
London, ship, 237.
 Lonins, 290.
 Loo, 145.
 Loot-Tsee, 182.
 Loo Tsoo Loo, 209.
 Louang Prabang, 152, 154, 157.
 Louisiana Tehuantepec Company, 536,
 540-1, 549, 554.
 Loveday Creek, 366.
 —, R. J., Esq., 366.
 Low, Hon. Hugh, 218-20, 222, 229, 231.
 Low-ma (Old Horse) Rapid, 36.
 Lowta, 255.
 Lu, 17, 160.
 Lucan Gorge, 9, 34.
 Lu (chow), 17, 21.
 Lucia, St., Bay, 335.
 Lucknow, 306.
 Luizze River, 63, 68.
 Lukki Fort, 312.
 Lumsden, Capt. Peter, 303, 305, 310.
 —, Col., 303, 310, 313-5.
 Lycus River, 78.
 Lynch, Commander, 94-5.
 Lyons, Mr., 510-11.
 — River, 382-3, 389-91, 427-8.
 •
 Macadam, Hon. John, 287, 431, 505-6.
 Macassar, 128, 131-2, 134.
 Macgowan, D. J., Esq., M.D., U.S., 74.
 Mackay, Mr., 295-6.
 Macpherson's Strait, 115, 118.
 Macqueen, James, Esq., 63.
 Madiacune, 63.
 Madras, 234.
 Mafor, 129.
 Maga-doo-khyoung Mountain, 172.
 Mahanaim, 90-1.
 Mahmud, 86.
 —, Sheikh, 89.
 Mahometans, 130.
 Mahsood, 307, 311.
 — Wazeeris, 306, 312-3, 315-7.
 Mahneh, ruin, 91.
 Mai, 159.
 Mai-ga-doo, 172-3.
 Mai-ga-doong, 166-8, 172, 176.
 Mai-ga-thoung, 166.
 Maitland River, 381, 398, 429.
 Majada Range, 546.
 Majolica, 290.
 Makaow Khao Mountain, 151.
 Makhrud Mountain, 99, 100.
 Malacca Strait, 241.
 Malagan (or Mongalian), 124.
 Malatengo River, 539, 541, 552, 554.
 Malays, 225-6, 229.
 Malincha, Doña, 547.
 Malpasa, 539-41.
 Maludu Bay, 228, 231-2.
 Manaar, Gulf of, 236.
 Manasseh, 92.
 Manatee, 267.
 Mangabal Grande, 277.
 Mango, 63.
 Manice (or St. George) River, 65-6.
 Manicasso, 63, 66.
 Manien-chang, 22.
 Manila traders, 127.
 Manning Mountain, 372.
 Manoel, Rio S., 269, 273, 275-7, 279.
 Mansorawa Lake, 26.
 Manuka, 300.
 Maories, 294.
 Maori pah, 297-8.
 Maoutse Tribe, 19, 41.
 Maranhão Grande, 278.
 — sinho, 278.
 Marei Parei, 222-3.
 Maria, Santa, 245.
 — Villa, 270.
 Maritzburg, 338-9.
 Marquesano, 546.
Marquis Huntley, ship, 241.
 Martaban, Gulf of, 239.
 Masahuiata, 538.
 Mashalka Arabs, 93-4, 96.
 Mashalkas, or Messalieks, 95.
 Mason's station, 294.
 Massagetae, 122.
 Mastepec, 553.
 Masters, 341, 348, 355, 367-8.
 Masuatss, 537.
 Matabello Islands, 133.
 Matadel, 546.
 Matatengo River, 537.
 Materia Medica, 101.
 Matson, Mr., 346.
 Matto Grosso, province of, 137-8, 141,
 269, 274, 278.
 Maué, 277.
 Maunduene, 68.
 Mauritius, 51.
 Mawhera-iti, 299.
 Maxiva, 63.
 May-ga-doong, 213.
 Mayne, Com. R. C., 529.
 Ma Yussu, leader, 22.
 Mazatlan, 553.
 Mazeba, 68.
 Maziuyo, 338-9.
 McCabe, Mr., 65-6.
 McCourt, J., 372, 429.
 McDonald, Dr., 59-60.
 McDonough's Creek, 528.

- McDouall ranges, 370.
 McGregor, Capt. Malcolm, 58.
 ———, Mr., 507.
 McKinlay Creek, 366.
 ———, J., Esq., 366.
 McLaer Inlet, 130.
 McPherson, 511.
 ——— Mount, 503-4.
 Mecca, 87.
 Mé (Chow), 22.
 Mediterranean, The, 104, 106, 235.
 Meerunai Valley, 308.
 Mein Koon Tso Broasbip, 197.
 Mejámie, Jisr, 93.
 Mekmel Mountain, 103.
 Me-Kon River, 142, 149-54, 156, 158-60, 162-3.
 Mekseh, 78.
 Melaleuca, 477.
 ——— leucodendron, 384.
 Melar, 155.
 Melbourne, 42, 51, 430, 431, 503 5.
 Mel Island, 139.
 Menado, 128.
 Menam, 160-1, 149, 153, 159.
 Menam-chi River, 158-9.
 Menamlae, 156.
 Menam Leuge River, 143, 158-9.
 ——— Ouan River, 158-9.
 Meneze River, 67-8.
 Mengatal, 222.
 Mengkabong Harbour, 217, 223, 225-6, 230.
 ——— River, 217-8.
 Menindie, 430-1, 438, 487, 500, 505, 518, 522, 529.
 Mergui Archipelago, 241.
 Merj Ayun basin, 107.
 Mermaid Strait, 376, 379.
 Merrick, Mr. H., 338.
 Meshakáh, Mikhail, 95.
 Mesopotamia, Lower, 76.
 Messallieks, 97-8.
 Mestiguila, 544.
 Metawileh, the Sheite Mohammedans of Syria, 104, 107.
 Mexico, 536, 538, 553.
 Mezár, 91, 92.
 Miaco, 289.
 Min, Fu-sung River, 26.
 Min (ho), 13.
 Min-kiang River, 17-8.
 Mien (chow), 22.
 Middle Strait, 111, 116, 119.
 ——— Hills, 118.
 Mijes, 540, 547.
 Mikado, 289.
 Milagro River, 539, 549.
 Millington, F., 301.
 Mill Stream, or Millstone River, 533.
 Minas Geraes, 271.
 Minas River, 140.
 Minatitlan, 538, 539-40, 547-9, 552, 554.
 Mindanao, 225.
 Mings, 28.
 Min River, 38, 40.
 Misericordia, 274.
 Mi-tan, Gorge, 9, 34-5.
 Mittunkote, 316.
 Mizpeh, 92.
 Mkuzi, 335-6.
 Mobyay, 164, 173, 198, 201.
 Moffatt, Mr. R., Jun., 338.
 Mogotenango, 553.
 Mogul, 311.
 Mohumbane, 63.
 Mokemai, 164.
 Molacan, 548, 554.
 Moluccas, 128, 130, 134-6.
 Molyneux, 94-5, 97.
 Momeetzai Wazeeris, 317.
 Momunds Hills, 307.
 Monay, 164.
 Monetza Creek, 546.
 Mongols, 215.
 Mongôse, 554.
 ——— River, 537.
 Monkey Point, 244.
 Monsoon, 234.
 Montanha, 277.
 Montgomery Island, 116.
 Moolooloo, 371.
 Moore, Mr. W., 373.
 Mordecais, 292.
 Moriarty, Mount, 529-30, 533.
 Morley Bank, 337.
 Morphett, Hon. John, 342.
 ——— Creek, 342, 370.
 Morretes, town of, 137, 139-40.
 Morrissey, M., 373.
 Moshesh, 339.
 Mosquito, 260, 262.
 ——— coast, 227, 244, 248, 250, 264, 267, 268.
 Mosquito tribe, 251-2, 256, 258-60, 262.
 Mosul, 79.
 Mutanie or Mutwongee Ranges, 519, 526.
 Motley, Mr., 232.
 Mortuiki, 57.
 ——— Mountain, 60.
 ——— Island, 44.
 Mouat, Dr., 109, 239.
 ——— Port, 116.
 Mouhot, M. Henri, 142, 152, 163.
 Moulmein, 125-6, 159, 183, 199, 207, 211, 234.
 Moung Dine, 172.
 ——— Hpo, 164, 183, 186, 189, 194-6, 198, 200, 204-5, 207.
 ——— Quay Lay, 164.
 Moviembene (or Luize) River, 65.
 Mud-Plains, 516, 525.

- Mueller, Fred., 476.
 Mujes, 553.
 Mukkeen, 313-4.
 Muludu Mountains, 218.
 Mundrucús, 275-9.
 Mungallee, 452.
 Mungulo Valleys, 310.
 Munkang, 199.
 Murchison Range, 340, 371.
 ——— River, 381, 427, 504.
 ———, Sir R. I., 84.
 Murray, 459, 472.
 Murut, 226.
 Mushir Pasha, 86.
 Mussoi bark, 127, 129-30.
 Mutzenkuchen, 544.
 Myo-oke, 216.
 Myat-tsau-ni-nung Pagodas, 164.
 My-Hpoo, 186.
 Myo Gyee, 164.
 ——— Oke, 164, 176.
 Mysol (or Misool), 130.
 ——— Island, 127.

 Nablous Mountains, 104.
 Nablús, 98.
 ———, the Shechem of Scripture,
 100.
 Nachi, 17.
 ——— (hien), 17.
 Nagadi, 59.
 Nagasaki, 280, 281, 285, 288.
 Naib, 306.
 Nairi Reef, 42.
 Nahr-el-Kelb, 77.
 Na-Khans, 181, 211, 213.
 Na-Khan (Quay-lay), 169, 174-5, 177-8.
 Nambiguaras, 271.
 Namena, 47.
 Nam-Houn River, 159.
 Namosi, capital, 59-61.
 Nanaimo River, 529-32, 535.
 Nan-ching, 21.
 Nandtherunga Creek, 454.
 Nanc, Mount, 159-60.
 Nanki (hien), 17.
 Nankin, 13, 27, 28.
 Nanoose, 532, 535.
 ——— Harbour, 532, 535.
 ——— Hills, 532.
 ——— Mountains, S., 533.
 ——— River, 533, 535.
 Nan-pai, 188, 206.
 ——— Khyoung, S., 184, 206.
 Nantobulla (or Hobson's Basin), 526.
 Nantherunga Creek, 509-10.
 Nan-thu-doo, 210.
 Nan-tsan-khan, 191.
 Naphtal, tribe of, 107.
 Nardoo, 494.
 ——— Creek, 495.

 Nat, 203, 204, 213.
 Natal, 335, 337-9.
 ——— Bay, 335.
 ——— Port, 337, 339.
 Nat Toung, 181.
 Naturaliste Cape, 425.
 Na Vatu, 56.
 Navua River, 59, 62.
 Nazareth, Country of, 90, 104.
 Necôth (spice), 101-2.
 Negro River, 137, 142, 275.
 Nehemiah's, 339.
 Nejha, 86.
 Nelson, 294, 298-300.
 Nepal, 304.
 Newcastle, Duke of, 354.
 ——— Water, 354-6, 361-4, 369-70.
 Newling, Mr. W., 338-9.
 New South Wales, 507.
 ——— Zealand, 294.
 Nicaragua, 260.
 Nicaraguan, 262.
 Nickol River, 376, 423-4.
 ——— Bay, 380, 388, 395, 398, 421,
 423, 426-7.
 Nicobar, Great, 241.
 Nicopolis, 69, 73.
 Nile, River, 105.
 Niltepec, 553.
 Nilu, 228, 230.
 Niu-fu-tu, 21.
 Nipa palm, 231.
 Niphon, 285, 288.
 Niza Longa Pass, 554.
 Nga-Pee-Tee's, 191.
 Ngatimamoi tribe, 298.
 Ngwae Toung, 186, 189-91, 194-7, 200,
 204.
 Nhundiacuara River, 139.
 North Reef Island, 111.
 North-West Bay, 531.
 Norton Plains, 405.
 Nong Balai, 193, 194, 196-7, 199-201.
 Nubian, 93.
 Nukrah, El, 89, 108.
 Nuntherunga, 430, 526.

 Oakover River, 407-8, 410-12.
 Oaxaca, 536, 546, 553.
 Obeida Abu, mosque of, 96.
 ———, tomb of, 94.
 Oham, 337.
 Okari River, 300.
 Oliphant's work, 27.
 Omar, Khalif, 94.
 Omekonto River, 66.
 Omeo, 441.
 Omos, 244.
 Ongcor Boreze, 150.
 ———, province of, 149-50, 154.
 ——— the Great, 149.

- Oo-Bo, 209.
 Oo-Moung, 164, 176.
 Oo-Myat, 171, 186, 189, 196.
 Oorghonj, 312.
 Oortukzai Affghans, 307.
 Oo-twai, 164, 167-9, 176, 205, 212-3.
 Orange River, 338.
 Origines Biblicæ, 97.
 Origstadtdt, 65.
 O'Riley, Edward, Esq., 164.
 Orwell, 241.
 Osaca, 280, 284, 286, 289-90.
 Ostuta, 542.
 Otates, 546.
 Otiapa, 547.
 Otira River, 295.
 Otta Era, 485.
 Ovalau Island, 43-4, 57.
 ——— Mountain, 60, 62.
 Oweka, 302.
 Owen, Captain, 66, 335, 337.
 ———, Professor, 124.

 Pa-Baa, 197.
 Pa-Bau Galay, 197.
 Pachiné River, 554.
 Pacific, 536-7, 553.
 ——— Coast, 550.
 ——— Ocean, 536, 538.
 ——— Plain, 537.
 Padoung, 192.
 Padan Aram, 76, 87-9, 100.
 Pa-le-loo, Khyoung, 172.
 Pharpar River, 76.
 Pailwar Kothul, 310.
 ——— Pass, 305-6, 310.
 ———, Town of, 310.
 Paka, 221.
 ——— Paka, 224.
 Paldromatta Creek, 505, 511, 525.
 Palestine, 91, 100, 105.
 Pallegoix, Bishop, 162.
 Palissy, 290.
 Palmas, 141.
 Palmyra, 79.
 Palomping Town, 142.
 Panamoroo Lake, 507-8.
 Panam Knot Mountain, 151.
 Pan Ban, 198.
 Panda, 237.
 Pandasan, 224-5.
 Panamoroo Creek, 526.
 Pan, temple of, 104.
 Papahaua Hill, 300.
 Paparoha, 297.
 Papua Kowizei, 130.
 ——— Oneu, 130.
 ——— Talanjong, or "Naked Papua,"
 131.
 Papuan countries, 128.
 ——— race, 127.

 Papuan tribes, 124-5.
 Papuans, or Asiatic/Negroes, 97.
 Pará, 274, 276, 278.
 Paraguay, 137-8, 278.
 ———, province of, 140.
 ——— River, 269-70.
 Paraná, Province of the, 137.
 ——— River, 137-42.
 Paranaguá, 137-40, 142.
 ——— Bay, 139.
 ——— City, 139.
 ———, Port of, 139.
 Paranapanema River, 137-8, 141.
 Parexis, 278.
 Paris, 142, 145.
 Parish, Sir Woodbine, 138.
 Paronuevo, 538.
 Patapa, 547.
 Pathans, 308, 311-2.
 Patook River, 256, 258.
 Patos, dos, River, 270.
 Patten's Creek, 471.
 Patton, Mr., 438.
 Pa-tung, 35.
 Pashiné River, 537.
 Paso Nuevo, 548, 554.
 Paul Jones, schooner, 58-9.
 Paul, St., province of, 137-8.
 Paul's, St., 140.
 Pavinira, 553.
 Pa-way, 169.
 Paxton, Mr. H. F., 335.
 Payas, 258.
 Pearl Key Lagoon, 244, 248, 250, 259.
 Pearse Plain, 533, 535.
 Pechaburi, province of, 149.
 Peetu Yoola, 264.
 Pegu, 164, 185-6, 191, 197, 239.
 ———, Governor of, 204.
 Peishih Creek, 91.
 Peixes, River de, 271-2.
 Pekin, 23, 27.
 Pemberton Islands, 424.
 Pemberton's, General, collection of
 Voyages and Travels, 109.
 Pemptielan Village, 143.
 Penang, 234.
 Pengantaran, 224, 229.
 Penneireiros, 271.
 Penokok, 224, 229.
 Penons, 162.
 Peniel, 96.
 Penusub, 221.
 Persia, 79.
 Persians, 94.
 Perth, 372.
 Peru, 269.
 Peshawur, 303, 316.
 ——— Valley, 307-8.
 Pesqueiro, 276.
 Petapa, 549.
 ———, Del Banco, 541.

- Petchaburi, province of, 151.
 Peterman Mountain, 222.
 Petermann, Dr. H., 82.
 Phacpar River, 80.
 Phetchaloune, 158.
 Philippines, 127, 225.
 Phillip Creek, 341.
 ——— Mount, 391.
 Phillips, Mr. W., 431, 456.
 Phixaie, 161.
 Phu-Quoc or Koh-Tron Island, 150.
 Piarka-Mana, 258.
 Piasan Idan, 229.
 Picas Island, 139.
 Pichicapa, 553.
 Pidore, 128.
 Piet, 339.
 Pieter-maritzburg, 338-9.
 Pinas Blancas, 548.
 Pine Belt, 207.
 Ping-chi, 21.
 Ping-shan, 1, 13, 18-20, 22-3, 40-41.
 Pinhalu, 142-5, 149.
 Pinus longifolia, 183.
 Piquiry River, 137.
 Pirapo, 141.
 ——— River, 137.
 Pirghul Mount, 312, 315.
 Pisgah sight, 99.
 Pitchery, 452, 497.
 Plata, 547.
 Plate River, 137-8, 269.
 Playfair, Dr. G., 110, 114.
Photo, war-steamer, 111, 113, 116.
 Plupau taya, 264.
 Po Bya, 124.
 Poherna Lake, 296-7.
 Poissonier Point, 415.
 Poka Tinnamira, 495.
 Polygonum Cunninghami, 460.
 Polynesia, Western, 50, 56.
 Poon, 188.
 Poria Creek, 430, 439-40, 454, 458-9,
 515-7, 523-4, 529.
 Porter, Rev. J. L., 77, 100.
 Portillo de la Chivela, 538, 546.
 Portugero River, 541, 554.
 Pong Loun, 170, 173, 202, 206, 211.
 ——— Ngay, 182-3.
 ——— Ranges, 164.
 Powell Creek, 363.
 ———, J. W., Esq., 363.
 Pow-King (fu), town, 2.
 Poyang Lake, 27.
 Prahaw, Malay vessel, 128.
 Pratt, Dr., 74.
 Preparis Island, 239.
 Preto River, 270, 275.
 Prevesa, 689.
 Price, D., Esq., 548.
 Pritchard, Consul, 43-4, 51, 57-8, 60.
 Primrose, John, Esq., 344.
 Primrose, Mount, 344, 363, 369.
 Principe, town, 137, 140.
 Prinz Awala, 258.
 Pruriekow, 452.
 Pueblo Nuevo, 553.
 Punjab, 304, 306.
 Pun-shan (hien), 22.
 Pursut, 149.
 Puy, 496.
 Pya Teu, 197.
 Pyoon Khyoung, 164.
 Pway-kau-tah, 167.
 Qua-lah, 174, 176, 186, 193, 196, 203,
 211, 214.
 ——— San, 171.
 Quai-chow, 19.
 Qualicum trail, 532.
 Quamitoassimba, 68.
 Quangsee, 160.
 Quarantine, 139.
 Quartz Hill, 340.
 Queensland, 428.
 Quingulo River, 63.
 Rabbad, Castle of, 93.
 Rajib, 94.
 Ramas, 259.
 Ramree, 116.
 Rangoon, 211, 234.
 Rasheiya, 79, 101, 105, 107.
 Rat Point, 513-7, 525.
 Rebekah's Well, 84.
 Red Sea, 235.
 Reef, South Island, 116.
 Rekkad, El, 108.
 Rewa, 48, 50, 58.
 ———, King of, 42.
 Ribura River, 140.
 Richards, Captain G. H., 529.
 Richie's Reef, 374.
 Rider, Mr. W., 335-7.
Ringdove, H.M.S., 288.
 Rio de las Calzadas, 540.
 ——— Lazadero, 546.
 ——— Frio, 259.
 ——— Morto, 275.
 ——— Verde, 546.
 Ripot Island, 415-6.
 Ritter, Carl, 94-5.
 Robinson, Dr. Edward, 78, 82, 89.
 Robson, Rev. Smylie, 85.
 Rochfort, John, Esq., 294.
 Rockspring Station, 554.
 Roebuck Bay, 400.
 Roen, Island of, 129.
 Rogers, Mr. E. T., H.M.C., 80, 86.
 Rogradia, 546.
 Romain, Cape, 244.
 Ross Island, 114.

- Rottneft Island, 425.
Royalist, H.M.S., 241.
Rumynede, troop-ship, 114.
 Russell, Dr., 74-5.
 Russia, 2.
 Rutland Island, 111, 115, 117, 119.
 Rozmuk Plain, 313, 316.
 Saasing, 267.
 Sabe, 66, 245.
 Saddle Mountain, 118.
 — Peak, 112.
 Sa'd, Sheikh, 93-8.
 Saduk Saduk, 218, 224.
 Safa, 92.
 Safed Koh, Mountains, 303, 305, 307,
 310-12.
 Safet, Mountains of, 106-7.
 Sagun, R., 74.
 Sahil Cona, 107.
 — Maarakah, 106.
 Sahy River, 140.
 Saigon, 162.
 St. John, Spencer, Esq., 217.
 — River, 259.
 Salim (Shalem), 100.
 Salina de Juchitan, 541.
 — Santa Cruz, 536.
 Salkhad Castle (the ancient Salcha),
 108.
 Salsa-parilha, 273.
 Salt Marshes, 504.
 Salto de S. Simão, 269.
 — Grande, falls of, 138.
 Salwatty Island, 127, 129-30.
 Salween River, 179, 183-4, 187-90, 198,
 203, 206, 208, 211-14.
 Samana Range, 308.
 Sambatan, 229.
 Samson, Mount, 393.
 Samuel, Mount, 340, 370-1, 391.
 Sannamein, 87-8.
 San Andres de Tuxtla, 554.
 — Antonio, 553.
 — Bartola, 553.
 — Carlos, 553.
 — Christoval, 554.
 — Dionisio, 545, 553.
 — Domingo, 546, 549, 552.
 — Francisco Istaltepec, 546.
 — Geronimo, 545, 554.
 — José, 554.
 — Juan Guichicovi, 541.
 — Mateo, 545.
 — Miguel, 542, 546, 553.
 — de Chimalapa, 546, 549.
 — Pablo, 546.
 — Sebastian, 553.
 Sanderson, John, Esq., 335, 339.
 Sandstone Cave, 480.
 Sangute River, 63.
 Santa Cruz, 545.
 — Bay, 536.
 — Maria de Chimalapa, 546, 549.
 — del Mar, 545.
 — Guineyate, 545.
 — de Petapa, 546.
 — Teresa Canal, 546.
 Santarem, 270, 275, 279.
 São João River, 140.
 — Thomé River, 269, 275, 279-80.
 Sapangar Bay, 217.
 Sarabia River, 539.
 Saraburi, 152, 155-6.
 Sarawak, 230, 232, 554.
 Sarel, Lieutenant-Colonel, 1, 26, 38.
 Sartebah, Kara, 100.
 Sayap, 229.
 Savage, Mr. Charles, 54, 55.
 Scanderoon, 79.
 Schereschewsky, Rev. S., 1, 36-7.
 Schorman, S. J., 64.
 Scratchley Creek, 480.
 Sea, Dead, 108.
 Sedmond, Mr., R.N., 58.
 Seekaram Mountain, 307.
 Seemann, Dr. B., 51.
 Sekka, village, 80, 86.
 Semeter, village, 129.
Semiramis, steam-frigate, 111.
 Seir, 96.
 Serabia River, 541.
 Serle, Mount, 503.
Serpent, ship, 241.
 Serra do Mar, 140.
 — Negra River, 139-40.
 Sete Quedas (Seven Falls) Island, 138.
 Seyer Islands, 241.
 Sgau-Karen, 168.
 Shahoar Valley, 314.
 Shah Hyder Mountain, 315-6.
 Shahsz', or Sha-sze, Junction, 4, 5, 7.
 Shahmochang Creek, 97.
 Shalem, city, 100.
 Shamil Nuddi, 311.
 Shang-hai, 1, 7, 10, 31, 36, 41.
 Shan Moung Hpo, 199, 200.
 — Poon-gye, 193, 216.
 — States, 164, 171, 175, 185-6, 188,
 192, 196-9, 202, 208, 211, 213-4.
 Shantow Pien Rock, 8, 23, 31.
 Shark's Bay, 504.
 Sha-sze, port of, 31.
 Shaw, Dr. Norton, 149-50, 373.
 — River, 405, 413-4.
 Shechem, or Land of Canaan, 76, 92,
 100.
 Sheikh Ahmed-el-Hariri, 88.
 — Ahmed-et-Türk, 86.
 She-kung, 21.
 Shemeish, Merj el, 107.
 Sherlock, 395, 397, 401-2, 407, 414,
 420-1, 428.

- Sheweydur, or Shah Hyder, Mountain, 312.
 Shib'a Route, 101.
 Shih-ta-kai, leader, 22.
 Shih-urh-pei Mountains, 5.
 Shillinglaw, —, Esq., 363.
 —, Mount, 363.
 Shi-pow-Chai Rock, 37.
 Shi-show, 3-4, 7, 12, 23, 30.
 Shooturgardan or Camel-neck Pass, 310.
 Short Range, 341.
 Shun-king, 21.
 Shwai Gyeen, 201, 206, 211.
 Shwaiah, 101.
 Siam, 144, 148-50, 157, 158-60, 162-3, 214, 231.
 —, King of, 155.
 Siamese, 159, 162, 186.
 Sian-kin-Shan, or the Little Golden Hill, 1.
 Si-chung, 2.
 Sidon, Mount, 92.
 Sierra de Chimalapa, 542.
 —, Madre, 537-8.
 Sikopf, 285.
 Simonosaki, 288.
 Simão, Salto de S., 274-5.
 Sinclair, Captain, 51.
 Sind, Upper, 303.
 Singapore, 128, 131.
 Sing-ti, 2, 29.
 Sintu, 22.
 Sirdar Muhammad Khan, 310.
 Sitang, Valley of, 165-7, 170, 174, 179, 181-90, 208-11, 213.
 Siwalihs, 312.
 Sloping Head, 374, 427.
 Smithfield, 337-8.
 Smith, Mr. J., 476.
 Smoos, 255-9.
 Smythe, Colonel, R.A., 51.
 Socomusco, 547.
 Sofaid Koh Valleys, 308-9.
 So-lo-lu, 207.
 Solut Arabs, 87.
 Somarais, Mount of the, 150.
 Somas, 534.
 Somosomo, 54, 62.
 Sonusco, 553.
 Sookias, 260.
 Sook Island, 127, 129.
 Sookwa, 246.
 Soolimani Range, 303-6, 309-12.
 Soopa, 262.
 Sound Island, 113, 241.
 Somu-Somu Valleys, 44, 48.
 Spice Islands, 281.
 Spinifex and Gum Plain, 364-7.
 Spit Point, 417.
 Srik, 267.
 Srokkhner, chiefs of the, 142.
 Sta. Maria de Guineyate, 541.
 Standish Ranges, 471.
 Stanley, Dr., 85.
 Stawell, Sir W., 436.
 Stephens, Mr., 151.
 Stewart, Dr. J. L., 313-6.
 Stewart's Strait, 113.
 Stien, 142, 144, 145-8, 150-1, 161.
 Stokes, Captain, 415.
 —, Ranges, 441-2, 458.
 Stone, Mr., 514-5.
 Stony Desert, 483, 487.
 Stormberg, 338.
 Strelley River, 404, 414, 417-9.
 Stuart, Mr. J. M'Donnall, 340, 504.
 Strzelecki Creek, 452.
 Start, 447, 460, 489, 503-4, 506, 510-11.
 —, Plains, 346-58, 361-3, 365.
 Succoth, 96, 100.
 Suchil, 537, 539-41, 547, 552-4.
 Su-chow, 13, 16-9, 38-40.
 Suelling (hien), 22.
 Suf, 92.
 Sök el Khan, 106-7.
 Sök-Wadi Barada, 78.
 Salaman River, 217-8, 223, 225-6, 230.
 Soli Mountains, 68.
 Sullivan, 348, 365.
 Sult (Arab tribe), 86.
 Sul, Rio Grande do, 137.
 Sumatra, 241.
 Sumidoro River, 269-71, 279.
 Summer Lake, 294.
 Sun-chu (fu), 2.
 Sunderbunds, 118, 238.
 Sungsung, 246.
 Sunula, 103, 106.
 Sunla Mountains, 540.
 Suonada Sea, 284-5, 288.
 Suf, 91.
 Superagay, 141.
 Supply, cutter, 299.
 Surprise Creek, 458.
 Suva Bay, 58.
 —, Port, 57.
 Sydney, 42, 51, 57.
 Symes, Colonel, 102, 109.
 Syria, 74 *et seq.*
 —, Carlo, plains of, 104-5, 107.
 Sz'chuan, Province of, 2 *et seq.*
 Tabasco, 538, 549, 553.
 Tabor, Mount, 90, 92, 104.
 Tagacaba River, 139.
 Tagow, 230.
 Tahiti, 51.
 Taico Sama, 282.
 Tai-ping Canal, 3, 5, 29, 31.
 Tai-pings, 13-4, 21, 22, 27, 41.
 Tak, 305, 317.
 Taka Taka, 297.

- Take-ke-Zam, 305, 314-6.
 Takimoto, 289.
 Ta-kin-Shaa, the Great Hill, 1.
 Takiwo, 287-8.
 Tali: (foo), 22.
 Taltawinge, 510-1.
 Tamarix dioica, 317.
 Tambalan Hill, 217.
 Tambian, 221.
 Tamparuli, 227, 230-1.
 Tampasuk, 228, 230, 232-3.
 ——— River, 217-9, 224-9, 233.
 Tandower Swamp, 507.
 Tapachula, 553.
 Tapajos, 275-7, 279-80.
 Tapana, 553.
 Tapanhonas, 271, 279.
 Taquaralzinbo, 269.
 Taramakau, 295-6.
 Tarauaki, 300.
 Tarifa, 537, 546, 550.
 Tarpum, 267.
 Tarring, 266.
 Tartar Government, 2.
 Tartarra Peak, 308.
 Tartary, 307.
 Tasman, Abel Jansen, Dutch navigator, 42.
 Tatla, or Algodonal, 540.
 Taurus, Mount, 74.
 Tau-tai, 38.
 Tave River, 64.
 Taviuni Mountain, 62.
 Tavuki Bay, 58.
 Tawarran, 223-5, 227-30, 232.
 ——— River, 217, 226.
 Taylor Lake, 294.
 Taylor's Station, 294-5.
 Tehakulow, 452.
 Tea Island, 49.
 Tea-tree Spring, 477.
 Tecuistlan, 542.
 Teerah River, 308.
 ——— Valley, 307-8.
 Tegistlan, 553.
 Tehuantepec, 544-5, 550, 552-4.
 ———, Isthmus of, 536, 544.
 ——— Plain, 542.
 Telli, or Tees, River, 338.
 Teltawinge, 525.
 Temimber, 131.
 Temple, Great, Hill, 30.
 ———, Little, Hill, 30.
 Ten-Degree Channel, 241.
 Tennant Creek, 541, 371.
 Teor Island, 133.
 Terabie River, 527.
 Terapei-nye-noung, 169.
 Ternate, 128-30, 134.
 Terro Morro, 536.
 Tesitepec, 547.
 Tha-bo-loo, 182.
 Thadua, 160-1.
 Thakambau, King, 44-5.
 The-yai-yo, village of, 166-7.
 Thee-la, 207.
 Theresa, Santa, 140-1.
 Thesprotia, 73.
 Thge-yai-yo, 176.
 Thibetans, 145.
 Thibet, 23.
 Thoak-yai-Khat-Khyoung, 164-6, 168-9, 172, 179, 208-9.
 Thring, 340, 343, 347-8, 350-3, 359, 362, 367-8.
 ——— Creek, 471.
 Tibagy River, 137-8, 141.
 Tiberias, Lake, 89-90, 93, 104, 108.
 Tibet, 26, 41.
 Tibue Village, 91, 93.
 Tidore, 129.
 Tien-Chow Pagoda, 32.
 ——— Sien Treaty, 35.
 Tierra Blanca, 546.
 ——— Nueva, 548.
 Tiete River, 138.
 Tigris River, 76-7.
 Ting-yuen, mien (chow), 21-2.
 Tirtawinge Creek, 526.
 Tobasco, 554.
 Tocaio, 291.
 Todolapa, 553.
 To-lo-lu, 208.
 Tomkinson Creek, 343, 364-5, 367, 369-70.
 ———, S., Esq., 343.
 Tongan Island, 52.
 Tonli-Sap Lake, 149.
 Tonola, 553.
 Tonquin, 162.
 Tooba, 267.
 Tookey, Charles, 84.
 Too-la-pai, 200.
 Toongla River, 245.
 Toonglas, 258.
 Toori Tribe, 310.
 Tooritoro Range, 510.
 Toquunter, 452.
 Torowotto, or Duroodo, Swamp, 430-1, 505-6, 509, 511-6, 524-5.
 Torrentera de Guihelona, 541.
 Toungu, 164-5, 169-73, 175-6, 179, 185-6, 191, 195, 197-9, 202-5, 207, 209-11.
 ——— Pagoda, 165.
 ——— Yaings, 182.
 Toang-yas, 166, 170.
 Toungoo, 201, 211.
 Toutai, the, 14.
 Tragacanth shrub, 101.
 Trans-Indus Salt-range, 303, 305, 316-7.
 Trapande Bay, 139.
 Trevelyan, Sir W. C., 294.
 Tripang or Sea-slug, 127, 129.
 Trincomalee, 234.

- Trinchow Pagoda, 7.
 Tropas, River, 277.
 Truxillo, 244.
 Tsau-kai, Karen chief, 166, 177.
 Tse-yee, 173.
 Tsing-tan Rapid, 34.
 Tu-feh, 41.
 Tugela, 337.
 Tu-hau, 221, 228.
 Tukht-i-Sooliman, 304, 212.
 Tangku, 225.
 Tangu, 164.
 Tang-shu tree, 9, 11.
 Tung-ting Lake, 2, 3, 5, 23, 26, 29.
 Tungtz, nut, 35.
 Tung Yai, 149.
 Turgbar Mountains, 312.
 Turiwhite, Mount, 296.
 Turner, Commander J., 372, 375.
 ——— Creek, 487.
 ———, Mr., 408, 425, 429.
 Turra, 89.
 Tuztla, 553.
 ——— Grande, 553-4.
 Twaka River, 245, 258.
 Twakas, 258.
 Tycoon, 280, 284-5.
 Fyre, 82, 107.
 Uba Valley, 106.
 Uieno, 291.
 Umbulazi, 337.
 Umflossi, 337.
 Umgeni River, 335.
 Umzimkulu, 339.
 Umzimvubu, or St. John's River, 339.
 Urisino, 287.
 Urubd Punga, Fall of, 138.
 Uruguay River, 137-8, 140.
 Uspanapa River, 538-40.
 Usukan Bay, 217.
 Uta, 131.
 Utanata River, 130.
 Utung-klow, 22.
 Uyses, 337.
 Valetta, 57.
 Vancouver Island, 529.
Vandalia, corvette, 51.
 Van Diemen Gulf, 340.
 Vanna Levu Island, 43, 56.
 ——— Mountain, 53, 57, 62.
 Varadouro River, 139.
 Velho, Porto, 269-70, 279.
 Venta, 546.
 Ventosa, 549, 553.
 Vera Cruz, 553-4.
 Verde River, 554.
 Vereker, Hon. H. P., 137.
 Victoria, 348-9, 352, 361, 367-9, 430, 504, 535.
 Vidal, Cape, 337.
 Vienge Thiane, 154.
 Villa Alta Mountains, 540, 542, 553.
 Viri, tribes of, 141.
 Viti, 52.
 ——— Levu, 53, 56-7.
 ——— Island, 43.
 ——— Mountain, 60.
 ——— River, 58.
 Vom Pouye River, 168.
 Voma Peak, 60.
 Von Bibra, C., 373.
 Vuni-wai-vutaku town, 59.
 Vizagapatam, 237.
 Wady Ajlun, 93, 95.
 ——— Arabun, 96.
 ——— Fakaris (Buckingham), Fedjarith (de Bertou), or Fajaris (Lynch), 95.
 ——— Fara, or El Makhrud, 99, 100.
 ——— Rajib, 94-6.
 ——— Shellale, 89, 90.
 ——— Shellali, 108.
 ——— Zerka, the Jabbok of Scripture, 96, 99.
 ——— el Samak, the Scripture Aphek, 108.
 ——— el Tayin, 104-5, 107.
 Wai-dina River, 60.
 Waigioa Island, 127, 129-30.
 Waitakeri, 300.
 Waitoki, 300.
 Waimangarako, 300.
 Wakaia Island, 44.
 Walcott, Mr. P., 373, 380, 398-400, 424, 429.
 Wales, New South, 42, 55.
 Walker, Dr. J. P., 115, 121, 124.
 ———, Major James, 303.
 Wall, Mr., 348, 359, 362, 369.
 Wallace, A. R., Esq., 127.
 ———, Mr., 275.
 Wan, 10-2, 26, 35-6, 38.
 Wandamen, 129.
 Wanganui, West, 300.
 Wan (hien), 11, 21.
 Wannominta Creek, 455, 505, 510, 525-6.
 Wanx, or Wanks, River, 250, 260.
 Warree, 253.
 Warrel, 246.
 Washington, Admiral, 235.
 Waterberg, Boer Settlement, 64.
 Waterhouse, Mr., 60.
 Watson Creek, 346-7.
 Wawa River, 250.
 Wazeeris, 311, 313, 315.
 Weewee, Red, 266.
 Welch, Mr., 445, 449, 451.
 Wesley, John, ship, 51.

- Westmoreland, 298.
 West Sandy Tableland, 368.
 Wetzstein, Dr., 80-2, 86, 90, 96.
 We-yuen, 22.
 Wheeler, Mr., 430, 449, 451.
 Whittington Range, 341, 343, 370.
 ———, W. S., Esq., 341.
 Wildebeeste Vlachie, or Gun Flat, 339.
 Wilkes, Commodore, 42-4.
 Wilkie, Hon. W., 441.
 Wilkie's Creek, 458-9.
 Williamstown Observatory, 502-3.
 Wills, Fort, 447.
 ———, Mr., 430-9, 449-50, 454, 459, 476,
 483, 487, 502-3, 505-7, 510, 526.
 Williams, Mr., 46, 48, 373.
 Wilson, Mount, 504.
 ———, Mr. J., 338.
 Wind-box Gorge, 35.
 Wit, M. de, 285, 288-9, 291.
 Witteberg, 338.
 Wittebergen, 338.
 Woodforde, 348, 353, 355-6, 359, 362,
 365, 367-8.
 Woo-hoo, 28.
 Woo-sung River, 27, 36, 38.
 Wortabet, John, M.D., 100.
 Wotwinge, 526.
 Wright, Mr., 505-7, 529.
 Wright's Creek, 506-7.
 Wu-chang, Viceroy of, 29.
 Wu-shan Gorge, 33.
 ——— (hien), 9, 35, 91.
 Wuzecree, 317.
 Wuzecris, 306-7.
 Wuzecristan, 317.

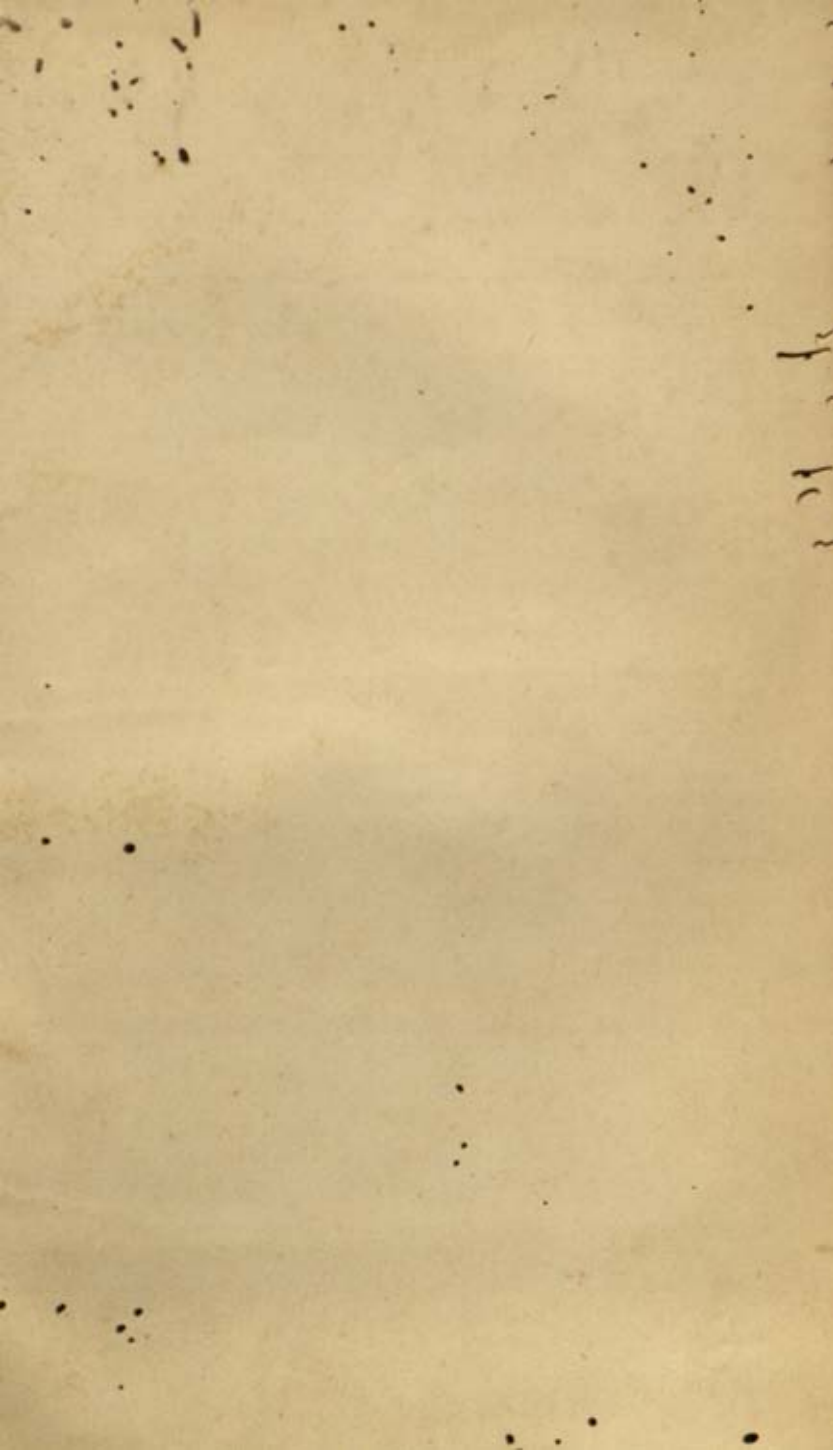
 Xapeco, 141.
 Xingú, or Xuigú, 277.
 Xiririca, 140.
 Xochapa, 554.
 Xoxocata Creek, 546.

 Yago, St., 546.
 Yaing Tribes, 182.
 Yaings, 167-76, 180, 186, 188, 191, 201-
 3, 207-10, 212, 214, 216.
 Yan-shai, 215.

 Yang-chi, 5, 6.
 Yang-tse River, 1-3/9, 17-19, 23.
 ———, Upper, 4-7, 10, 13-4, 26-7,
 29, 31, 40.
 Yanuca, Mountain, 60.
 Yarabale Isthmus, 58.
 Yarmuk, 88-9, 108.
 Yarring Yoola, 264.
 Yatahy, 141.
 Yawmat Niha, 106.
 Yeddo, 280-1, 283-6, 289-90, 292.
 Yeh (tan) Rapid, 9.
 Yellow-tail, 245.
 Yeltawinge Creek, 510.
 Yetan Rapid, 35.
 Yew, 287.
 Yguapé River, 137.
 Yguassú River, 137-8.
 Yochi, 17.
 Yo-chow, 1-5, 7, 20, 22, 29, 34.
 Yomah, 171-3.
 Yoon-za-len, 179.
 Young Yai, 216.
 Yoului River, 17.
 Yow-ku-tu, 22.
 Yule River, 402-3, 417-20.
 Yunan, 18-23, 26, 39, 40-1.
 Yunnan, 22, 160.
 Yvenheima River, 138.

 Zadran Range, 312.
 Zahleh, 77, 79.
 Zahraný, El, stream, 106.
 Zám, 315, 317.
 Zambor, 546.
 Zapatécos, 544.
 Zarka, 89.
 Zerka, 93.
 Zhun-huei, or Chi-shui River, 17.
 Zizyphus jujuba, 317.
 Zoolimani Range, 303.
 Zoomut Mountains, 312.
 Zouques, 546.
 Zoutpansberg, or Salt Mountain, 63-7.
 Zuleta, 554.
 Zulu, 335-6.
 Zaurberg, 338.
 Zymookht Affghans, 311.

END OF VOL. XXXII.





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